



**THEME [SPA.2013.1.1-02]
[Ensemble system of regional re-analyses]**

Grant agreement for: Collaborative project*

Annex I - "Description of Work"
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Project acronym: UERRA

Project full title: "Uncertainties in Ensembles of Regional Reanalyses"

Grant agreement no: 607193

Version date: 2013-09-23

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A1:

Project summary

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per project

General information

Project title ³	Uncertainties in Ensembles of Regional Reanalyses		
Starting date ⁴	01/01/2014		
Duration in months ⁵	48		
Call (part) identifier ⁶	FP7-SPACE-2013-1		
Activity code(s) most relevant to your topic ⁷	SPA.2013.1.1-02:Ensemble system of regional re-analyses		

Abstract ⁹

An ensemble system of regional reanalyses will be developed and run for the climatological time scale. The information content of the datasets and their uncertainties will be assessed in several ways and statistics analysed.

The project will provide long-term datasets of Essential Climate Variables (ECVs) on the European regional scale in order to support adaptation action and policy development. The datasets will contribute to Climate services for Copernicus, climate monitoring and research.

Regional reanalyses will be made in Ensemble mode and there will also be individual reanalyses with different models and methods. Observational data rescue (digitizing data in archives not currently available for use) will continue from EURO4M and enhanced gridded datasets will be developed and used for validation. The ensembles together with gridded datasets will form the basis for estimation of uncertainties of the constituent members. Large datasets will be built up and open and user-friendly access methods will be established together with the work in other topics of the SPACE call.

This project builds on the experiences and developments in EURO4M but now the reanalyses will cover climate analysis time scales (30 to 50 years) and pioneer ensemble techniques for regional scale and highresolution reanalysis. It will build on and extend the global reanalyses (topic -01 ERA-20C, ERA-CLIM2 and ERA-Interim). Further downscaled high-resolution reanalyses will also be performed where more near surface ECV observations can be utilized. Indicator information (including uncertainties) will be applied to the reanalyses and there will be extensive validation against remote sensing and hydrological data. They will add to the validation effort, respond to user requirements, and demonstrate how the reanalysis information is best utilized for understanding past climates and climate change.

A2:

List of Beneficiaries

Project Number ¹	607193	Project Acronym ²	UERRA
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List of Beneficiaries

No	Name	Short name	Country	Project entry month ¹⁰	Project exit month
1	SVERIGES METEOROLOGISKA OCH HYDROLOGISKA INSTITUT	SMHI	Sweden	1	48
2	METEO-FRANCE	MF	France	1	48
3	KONINKLIJK NEDERLANDS METEOROLOGISCH INSTITUUT-KNMI	KNMI	Netherlands	1	48
4	MET OFFICE	MO	United Kingdom	1	48
5	UNIVERSITY OF EAST ANGLIA	UEA	United Kingdom	1	48
6	EIDGENOESSISCHES DEPARTEMENT DES INNERN	EDI	Switzerland	1	48
7	UNIVERSITAT ROVIRA I VIRGILI	URV	Spain	1	48
8	ADMINISTRATIA NATIONALA DE METEOROLOGIE R.A.	NMA-RO	Romania	1	48
9	EUROPEAN CENTRE FOR MEDIUM-RANGE WEATHER FORECASTS	ECMWF	United Kingdom	1	48
10	DEUTSCHER WETTERDIENST	DWD	Germany	1	48
11	METEOROLOGISK INSTITUTT	MI	Norway	1	48
12	RHEINISCHE FRIEDRICH-WILHELMS-UNIVERSITAET BONN	UB	Germany	1	48

A3:

Budget Breakdown

Project Number ¹	607193	Project Acronym ²	UERRA
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One Form per Project

Participant number in this project ¹¹	Participant short name	Fund. % ¹²	Ind. costs ¹³	Estimated eligible costs (whole duration of the project)					Total Receipts	Requested EU contribution
				RTD / Innovation (A)	Demonstration (B)	Management (C)	Other (D)	Total A+B+C+D		
1	SMHI	75.0	A	1,320,000.00	0.00	115,000.00	218,000.00	1,653,000.00	0.00	1,323,000.00
2	MF	75.0	F	603,360.00	0.00	0.00	0.00	603,360.00	0.00	452,520.00
3	KNMI	75.0	A	728,200.00	0.00	2,000.00	235,800.00	966,000.00	0.00	783,950.00
4	MO	50.0	A	1,222,835.00	0.00	3,000.00	0.00	1,225,835.00	0.00	614,417.00
5	UEA	75.0	T	326,400.00	0.00	0.00	0.00	326,400.00	0.00	244,800.00
6	EDI	75.0	T	143,040.00	0.00	0.00	0.00	143,040.00	0.00	107,280.00
7	URV	75.0	T	364,800.00	0.00	0.00	0.00	364,800.00	0.00	273,600.00
8	NMA-RO	75.0	A	27,000.00	0.00	0.00	0.00	27,000.00	0.00	20,250.00
9	ECMWF	75.0	T	329,264.00	0.00	0.00	0.00	329,264.00	0.00	246,948.00
10	DWD	75.0	S	704,032.00	0.00	0.00	135,606.00	839,638.00	0.00	487,622.00
11	MI	75.0	A	138,427.00	0.00	0.00	0.00	138,427.00	0.00	103,820.00
12	UB	75.0	T	455,360.00	0.00	0.00	0.00	455,360.00	0.00	341,520.00
Total				6,362,718.00	0.00	120,000.00	589,406.00	7,072,124.00	0.00	4,999,727.00

Note that the budget mentioned in this table is the total budget requested by the Beneficiary and associated Third Parties.

*** The following funding schemes are distinguished**

Collaborative Project (if a distinction is made in the call please state which type of Collaborative project is referred to: (i) Small of medium-scale focused research project, (ii) Large-scale integrating project, (iii) Project targeted to special groups such as SMEs and other smaller actors), Network of Excellence, Coordination Action, Support Action.

1. Project number

The project number has been assigned by the Commission as the unique identifier for your project, and it cannot be changed. The project number **should appear on each page of the grant agreement preparation documents** to prevent errors during its handling.

2. Project acronym

Use the project acronym as indicated in the submitted proposal. It cannot be changed, unless agreed during the negotiations. The same acronym **should appear on each page of the grant agreement preparation documents** to prevent errors during its handling.

3. Project title

Use the title (preferably no longer than 200 characters) as indicated in the submitted proposal. Minor corrections are possible if agreed during the preparation of the grant agreement.

4. Starting date

Unless a specific (fixed) starting date is duly justified and agreed upon during the preparation of the Grant Agreement, the project will start on the first day of the month following the entry into force of the Grant Agreement (NB : entry into force = signature by the Commission). Please note that if a fixed starting date is used, you will be required to provide a detailed justification on a separate note.

5. Duration

Insert the duration of the project in full months.

6. Call (part) identifier

The Call (part) identifier is the reference number given in the call or part of the call you were addressing, as indicated in the publication of the call in the Official Journal of the European Union. You have to use the identifier given by the Commission in the letter inviting to prepare the grant agreement.

7. Activity code

Select the activity code from the drop-down menu.

8. Free keywords

Use the free keywords from your original proposal; changes and additions are possible.

9. Abstract

10. The month at which the participant joined the consortium, month 1 marking the start date of the project, and all other start dates being relative to this start date.

11. The number allocated by the Consortium to the participant for this project.

12. Include the funding % for RTD/Innovation - either 50% or 75%

13. Indirect cost model

A: Actual Costs

S: Actual Costs Simplified Method

T: Transitional Flat rate

F :Flat Rate

Workplan Tables

Project number

607193

Project title

UERRA - Uncertainties in Ensembles of Regional Reanalyses

Call (part) identifier

FP7-SPACE-2013-1

Funding scheme

Collaborative project

WT1

List of work packages

Project Number ¹	607193	Project Acronym ²	UERRA
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LIST OF WORK PACKAGES (WP)

WP Number ⁵³	WP Title	Type of activity ⁵⁴	Lead beneficiary number ⁵⁵	Person-months ⁵⁶	Start month ⁵⁷	End month ⁵⁸
WP1	Data Rescue and development, gridded and observational datasets	RTD	7	97.00	1	36
WP2	Ensemble Data Assimilation Regional Reanalysis Dataset	RTD	4	348.00	1	48
WP3	Assessing uncertainties by evaluation against independent observational datasets	RTD	10	85.00	1	48
WP4	Facilitating downstream services (data, derived products and outreach)	RTD	3	64.00	1	48
WP5	Consortium Management	MGT	1	8.00	1	48
WP6	Scientific Coordination	RTD	1	9.00	1	48
WP7	Dissemination & Outreach	OTHER	1	13.00	1	48
WP8	User feedback	OTHER	3	12.00	1	48
WP9	Overarching Coordination FP7 Copernicus climate change projects	OTHER	3	8.00	1	48
Total				644.00		

WT2:

List of Deliverables

Project Number ¹	607193	Project Acronym ²	UERRA
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List of Deliverables - to be submitted for review to EC

Deliverable Number ⁶¹	Deliverable Title	WP number ⁵	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D1.1	DARE list of sources	WP1	7	4.00	Report	PU	6
D1.2	DARE station locations	WP1	7	2.00	Report	PU	10
D1.3	DARE gaps post 1950	WP1	7	15.00	Report	PU	18
D1.4	DARE gaps pre 1950	WP1	7	12.00	Report	PU	24
D1.5	DARE Quality control	WP1	7	11.00	Other	PU	30
D1.6	DARE homogenisation	WP1	5	20.00	Other	PU	36
D1.7	DARE QC data use in UERRA	WP1	7	2.00	Other	PU	36
D1.8	DARE data archives	WP1	7	3.00	Other	PU	36
D1.9	E-OBS impact of the data	WP1	3	4.00	Report	PU	15
D1.10	Gridding improvements	WP1	5	7.00	Other	PU	24
D1.11	Gridding resolution assessment	WP1	3	4.00	Report	PU	30
D1.12	Gridding resolution enhancement	WP1	3	2.00	Other	PU	24
D1.13	E-OBS updates	WP1	3	2.00	Other	PU	36
D1.14	Gridding Uncertainty estimate	WP1	5	9.00	Report	PU	36
D2.1	Ensemble Variational DA development	WP2	4	50.00	Report	PU	21
D2.2	Ensemble Variational DA observations	WP2	4	30.00	Report	PU	24
D2.3	Ensemble Variational DA diagnostics	WP2	4	50.00	Report	PU	30

WT2:

List of Deliverables

Deliverable Number ⁶¹	Deliverable Title	WP number ⁵	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D2.4	Ensemble Variational DA documentation	WP2	4	30.00	Report	PU	42
D2.5	HARMONIE physics ensemble	WP2	1	12.00	Report	PU	12
D2.6	HARMONIE initial production	WP2	1	36.00	Report	PU	30
D2.7	HARMONIE production datasets	WP2	1	25.00	Report	PU	45
D2.8	MESCAN downscaling	WP2	2	40.00	Report	PU	45
D2.9	MESCAN ensemble	WP2	2	10.00	Report	PU	30
D2.10	MESCAN cloud analysis	WP2	1	7.00	Report	PU	24
D2.11	Kalman Filter Ensemble DA observations	WP2	12	10.00	Report	PU	15
D2.12	Kalman Filter Ensemble DA development	WP2	12	20.00	Report	PU	21
D2.13	Kalman Filter Ensemble DA diagnostics	WP2	12	14.00	Report	PU	45
D2.14	RA uncertainty evaluation	WP2	4	14.00	Report	PU	45
D3.1	Definition Workshop	WP3	10	7.00	Other	PU	3
D3.2	Evaluation procedures	WP3	10	2.00	Report	PU	6
D3.3	Programme package	WP3	10	13.00	Other	PU	15
D3.4	Evaluation experiences	WP3	10	4.00	Report	PU	24
D3.5	Preliminary assessment	WP3	10	12.00	Report	PU	34
D3.6	Scientific assessment	WP3	10	23.00	Report	PU	45
D3.7	Synthesis Workshop	WP3	10	8.00	Other	PU	45
D3.8	User synthesis	WP3	3	16.00	Report	PU	48

WT2:

List of Deliverables

Deliverable Number ⁶¹	Deliverable Title	WP number ⁵	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D4.1	MARS archives	WP4	9	18.00	Other	PU	48
D4.2	Data plan	WP4	3	6.00	Other	PU	12
D4.3	Visualisation	WP4	9	2.00	Prototype	PU	12
D4.4	ESGF	WP4	3	8.00	Other	PU	36
D4.5	Climate indices	WP4	3	8.00	Other	PU	48
D4.6	HYPE report	WP4	1	6.00	Report	PU	10
D4.7	Hydrological evaluation	WP4	1	2.00	Report	PU	45
D4.8	TRIP evaluation	WP4	2	14.00	Report	PU	45
D5.1	GA and REA meetings	WP5	1	4.00	Report	PU	48
D6.1	Coordination plan	WP6	1	1.00	Report	PU	8
D6.2	MST meetings and minutes	WP6	1	2.00	Other	PU	48
D6.3	ESAB meetings	WP6	1	1.00	Other	PU	48
D7.1	General dissemination plan	WP7	1	2.00	Report	PU	3
D7.2	Training material	WP7	10	2.00	Report	PU	48
D7.3	EU brief I	WP7	3	1.00	Other	PU	18
D7.4	EU brief II	WP7	3	1.00	Other	PU	33
D7.5	EU brief III	WP7	3	1.00	Other	PU	48
D7.6	Web site	WP7	1	1.00	Other	PU	15
D7.7	Newsletters	WP7	1	1.00	Report	PU	36
D7.8	UERRA event	WP7	1	1.00	Other	PU	32
D7.9	African workshop	WP7	3	1.00	Other	PU	24
D8.1	Initial review of user requirements	WP8	3	2.00	Report	PU	12
D8.2	User Workshop I	WP8	3	2.00	Other	PU	24
D8.3	Concluding User Workshop	WP8	3	2.00	Other	PU	42
D8.4	User guidance	WP8	3	4.00	Other	PU	48
D9.1	Plan of activities	WP9	3	1.00	Other	PU	36
D9.2	Web portal	WP9	1	1.00	Other	PU	6
D9.3	Lessons learned	WP9	3	3.00	Other	PU	24

WT2:

List of Deliverables

Delive- rable Number ⁶¹	Deliverable Title	WP number ⁵	Lead benefi- ciary number	Estimated indicative person- months	Nature ⁶²	Dissemi- nation level ⁶³	Delivery date ⁶⁴
D9.4	Meeting minutes	WP9	3	2.00	Other	PU	48
Total				630.00			

WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP1	Type of activity ⁵⁴	RTD
Work package title	Data Rescue and development, gridded and observational datasets		
Start month	1		
End month	36		
Lead beneficiary number ⁵⁵	7		

Objectives

- Assess both the need for synoptic-scale basic observational input for Regional RA and the historical data sources containing surface observations at the sub-daily scale and gain access to their archives
- Link and coordinate with existing data rescue initiatives and projects to optimise resources, avoid duplication and enhance data availability and accessibility
- Filling in gaps for available synoptic-scale observations for data-sparse European regions and periods post-1950 and further recovery and digitization of synoptic-scale observations for data-sparse European regions and periods pre-1950
- Enhance high-quality synoptic-scale data development, including methodological improvements for climate time-series homogenisation at the hourly scale in support of enhanced Regional Reanalysis (RRA) development for Europe
- Enhance gridding procedures within E-OBS, particularly for extremes
- Improve the uncertainty assessment within E-OBS, taking greater account of the changes in station density in both space and time. These uncertainties should also be more explainable and understandable within and outside the climate science community
- Continue to produce E-OBS in real time

Description of work and role of partners

WP1 - Data Rescue and development, gridded and observational datasets [Months: 1-36] **URV**

Data rescue (DARE) is the all encompassing term used within climate science to include determining the location of likely sources, organising plans for developing inventories and preserving (producing images of the material) the data they contain and digitising these data into usable forms. Within UERRA, the emphasis is twofold: to infill gaps over data-sparse European regions and the post-1950 period and to recover, digitise and develop longer time-series since the beginning of the 20th century. The key aspect in any data rescue activity is to determine both what is most needed (e.g. what will have the greatest effect in any new re-analysis) and what is possible given the many NMHS constraints on accessing both the archives and more importantly their digital holdings.

Under UERRA a new battery of QC tests will be defined and the digitized synoptic-scale data will be assessed to identify non-systematic errors at the sub-daily time scale. We will also explore the applicability of currently available state-of-the-art in homogenisation methods to adjust time-series at the hourly scale.

The E-OBS gridded observation dataset is being expanded across a number of regions where NMHSs are supplying KNMI with more extensive versions of their daily station data (principally for Tx, Tn, precipitation, but datasets of MSLP and snow cover are available for some parts of the continent). The differences in station availability are now quite marked across some parts of Europe. UERRA will investigate whether this dramatic difference in data density is adequately being catered for by the operational software. Specifically KNMI and UEA will investigate different approaches to the gridding, such as transformations of precipitation data to improve the interpolation of extreme values and to assess whether the resolution of the whole dataset could be improved in some parts of the continent. This will involve developing a gridding tool as a specific deliverable. Another issue is

WT3:

Work package description

how susceptible the gridding and particularly the gridding of extremes might be susceptible to changes in station density.

T1.1 - Data coordination, inventory and access to national archives [Months: 1-36]

URV, NMA-RO

Data rescue: URV will lead the effort to identify the data-sparse regions and periods (pre- and post- 1950s), coordinating with relevant stakeholders, accessing the relevant data sources planning the digitization tasks (about 3.7M hourly observations) and the reformatting of known data sources not yet in the MARS archive with the main focus on the recovery and digitization of sub-daily observations

NMA-RO will take part in rescuing synoptic-scale observations (~ 300K new hourly values to be provided to the MARS archive) over Romania and the Balkans countries and for both the post-1950 periods to fill in gaps with new 6-hourly observations and the pre-1950 period to extend back in time for key climate series for main ECVs and for the same European sub-region.

NMA-RO will also continue updating at near real time the E-OBS dataset with Romanian data (about 80K values of daily temperature and precipitation observations).

T1.2 - High-quality synoptic-scale data development [Months: 1-36]

URV, UEA

UData development URV and UEA will lead this task and work together to implement new QC and homogenisation strategies to adjust time-series at the sub-daily scale following a double strategy. While URV will be in charge of the testing of the individual recovered/digitized synoptical time-series with the new QC and homogenisation strategies implemented under UERRA, the UEA will ensure network consistency and data encoding.

T1.3 - Gridded and Observational Datasets [Months: 1-36]

KNMI, UEA, EDI

Observation gridding: KNMI and UEA will lead on the proposed improvements to the E-OBS dataset assessing whether the basic gridding procedure can be improved (particularly for extremes) and the potential impact on the grids of the large variations in station density across Europe.

EDI will contribute to the improvement of gridding procedures for E-OBS and estimation of uncertainties (based on the experience gained by EDI with stochastic simulation).

ECMWF and KNMI will include the E-OBS station database and other digitized data in MARS.

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	Task3 specific effort	WP1 additional effort	WP1 TOTAL
1 - SMHI	0.00	0.00	0.00	0.00	0.00
2 - MF	0.00	0.00	0.00	0.00	0.00
3 - KNMI	0.00	0.00	12.00	0.00	12.00
4 - MO	0.00	0.00	0.00	0.00	0.00
5 - UEA	0.00	12.00	13.00	0.00	25.00
6 - EDI	0.00	0.00	3.00	0.00	3.00
7 - URV	40.00	14.00	0.00	0.00	54.00

WT3:

Work package description

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	Task3 specific effort	WP1 additional effort	WP1 TOTAL
8 - NMA-RO	3.00	0.00	0.00	0.00	3.00
9 - ECMWF	0.00	0.00	0.00	0.00	0.00
10 - DWD	0.00	0.00	0.00	0.00	0.00
11 - MI	0.00	0.00	0.00	0.00	0.00
12 - UB	0.00	0.00	0.00	0.00	0.00
Total	43.00	26.00	28.00	0.00	97.00

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D1.1	DARE list of sources	7	4.00	Report	PU	6
D1.2	DARE station locations	7	2.00	Report	PU	10
D1.3	DARE gaps post 1950	7	15.00	Report	PU	18
D1.4	DARE gaps pre 1950	7	12.00	Report	PU	24
D1.5	DARE Quality control	7	11.00	Other	PU	30
D1.6	DARE homogenisation	5	20.00	Other	PU	36
D1.7	DARE QC data use in UERRA	7	2.00	Other	PU	36
D1.8	DARE data archives	7	3.00	Other	PU	36
D1.9	E-OBS impact of the data	3	4.00	Report	PU	15
D1.10	Gridding improvements	5	7.00	Other	PU	24
D1.11	Gridding resolution assessment	3	4.00	Report	PU	30
D1.12	Gridding resolution enhancement	3	2.00	Other	PU	24
D1.13	E-OBS updates	3	2.00	Other	PU	36
D1.14	Gridding Uncertainty estimate	5	9.00	Report	PU	36
		Total	97.00			

Description of deliverables

D1.1 : A comprehensive list of possible additional sources that can be accessed for digitisation and encoding (URV 4 pm) [month 6]

D1.2 : Report on the locations of the station data: digitised and to be digitised (URV 2 pm) [month 10]

D1.3 : Infilling in temporal and spatial gaps for the post-1950 period in Europe and its borders. Data subset (URV 14 pm, NMA-RO 1 pm) [month 18]

D1.4 : Infilling in European temporal and spatial gaps for the pre-1950 period. Data subset (URV 11 pm, NMA-RO 1 pm) [month 24]

D1.5 : Quality controlled time-series of synoptic observations for the post- and pre -1950 periods in Europe and its borders (URV 10 pm, NMA-RO 1 pm) [month 30]

WT3:

Work package description

D1.6 : Homogeneity and homogenisation assessments of station data as they are collected from the NMHSs and from other sources (UEA 10 pm, URV 10 pm) [month 36]

D1.7 : All the quality assessed sub-daily data made available to WP2 and publicly available through WP4. This will include additional datasets of daily and monthly averages and totals as some will likely be of use in this form in Task 1.3 and in WP3 (URV 1 pm, UEA 1 pm) [month 36]

D1.8 : Inclusion of D1.3, D1.4, D1.5, D1.6 data in the ECA&D system and MARS archive (URV 2 pm, UEA 1 pm) [month 36]

D1.9 : Assessment of the impact of changes in station density on the E-OBS dataset (KNMI 4 pm) [month 15]

D1.10 : Development of improvements to the gridding to enhance procedures during periods of extreme weather (UEA 5 pm, KNMI 2 pm) [month 24]

D1.11 : Assessment of the potential for enhancing the gridding resolution in parts of Europe, together with more comprehensive comparisons with NMHS derived gridded products (KNMI 2 pm, UEA 2 pm) [month 30]

D1.12 : Beta version of enhanced gridding software available to project partners (KNMI 2 pm) [month 24]

D1.13 : KNMI will both continue to update E-OBS in real time, and also develop the enhanced gridding software into a tool for more widespread use (KNMI 2 pm) [month 36]

D1.14 : Development of more comprehensive uncertainty estimations (UEA 6 pm, EDI 3 pm) [month 36]

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
MS1	Completion of D1.5 (synoptic obs. quality controlled)	7	30	Synoptic obs. archived
MS2	Completion of D1.6 (homogeneity tested and adjusted data)	7	36	Adjusted data archived
MS3	Completion of D1.8 (merged series of synoptical obs.)	7	42	Merged series archived

WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP2	Type of activity ⁵⁴	RTD
Work package title	Ensemble Data Assimilation Regional Reanalysis Dataset		
Start month	1		
End month	48		
Lead beneficiary number ⁵⁵	4		

Objectives

- Development and production of a satellite-era (1978-present) high-resolution European ensemble regional reanalysis dataset, based on ensemble-variational data assimilation.
- Adaptation and production of a deterministic HARMONIE reanalysis for 1961-present.
- Downscaling of ensemble and deterministic RA to provide km-scale European-wide reanalysis datasets.
- Development of a homogeneous reanalysis system for the pre-satellite-era using a hybrid local ensemble transform Kalman filter/ensemble nudging approach with RA data production of at least 5 years.
- Ensemble reanalysis uncertainty estimates derived from comparison of the UERRA reanalyses against each other, global (ERA) and regional (HErZ) RA.

Description of work and role of partners

WP2 - Ensemble Data Assimilation Regional Reanalysis Dataset [Months: 1-48]

MO

The EURO4M project (2010-2014) has provided the core 'deterministic' European regional reanalysis system, assimilating conventional, satellite and hydrological cycle (humidity, cloud, precipitation) observations into the Met Office Unified Model (UM)'s advanced four-dimensional variational (4D-Var) data assimilation (Rawlins et al 2007). The addition of the UERRA-MOGREPS-EU capability will provide consistent ensemble uncertainty estimates using a 20-50 member, regional configuration of the operational MOGREPS-G system currently implemented at Met Office for global operational probabilistic NWP.

Basic observation database will be from ECMWF MARS (ERA-CLIM), supplemented by high-resolution conventional observations made available for regional reanalysis by partners within UERRA WP1. There will be additional hydrological cycle observations suitable for high-resolution reanalysis, namely disaggregated precipitation accumulations and surface/satellite cloud observations for the period of the reanalysis.

The Ensemble Variational (EVDA) derived ensemble regional reanalysis will be evaluated deterministically through a) Comparison of ensemble mean against independent, unassimilated observations, and b) Sanity check on quality of forecast run from ensemble control analysis. Probabilistic evaluation of the quality of the ensemble reanalysis will be provided via spread-skill matching, rank histograms, and Brier skill scores. Additional evaluation against gridded observation datasets (e.g. E-OBS) and intercomparison with global (ERA-CLIM) and regional reanalysis datasets will be performed within UERRA WP3].

The HARMONIE Data Assimilation system as developed and used within the HIRLAM and ALADIN consortia will be implemented and optimised for the entire European area with surrounding sea areas at as high resolution as is possible (11 km and at least 65 levels). It will be run over a 50 year period, from 1961, and serve as one member of a multi-model reanalysis.

The physiographic properties will be derived or modelled to take the time evolution into account. Interaction with the surface (soil and sea and ice) is very important for the near surface ECVs and requires special attention. The data assimilation will be driven by the global ECMWF ERA-CLIM reanalysis and also use a large scale Jk constraint (Dahlgren, 2011) to add large Atlantic scale information from ECMWF satellite assimilation into the 3D-VAR minimisation.

WT3:

Work package description

MF will use the 2D-analysis system MESCAN, developed during the EURO4M project with SMHI, to provide a surface analysis for temperature, relative humidity, precipitation and wind. MF will downscale the HARMONIE 3D-VAR analysis as an input field or background for the 2D-analysis system ensemble surface analysis will be developed and evaluated on a shorter period (5 years) over Europe with MESCAN using uncertainties from task 2.1 and 2.2 and/or observation network and perturbed observations. MESCAN at 5.5 km. If possible additional surface datasets from WP1 will be used.

Good quality data CM-SAF data sets exist for both Geostationary METEOSAT and AVHRR polar platforms. They complement each other over the European area but an optimally gridded data set is needed for climate studies, validation of models and solar energy potential. A 2D pan-European analysis of cloud fraction will be run with the SMHI MESCAN for 30 years, at 5.5 km resolution 1982-2013.

A hybrid ensemble data assimilation system will be implemented for the DWD NWP model COSMO. The system will be comprised of a local ensemble transform Kalman filter component currently developed at the DWD and an ensemble nudging component for continuous data assimilation between two Kalman Filter initializations. The ensemble nudging will be based on the current nudging implementation in the COSMO model and make use of the covariance structure given by the ensemble realizations. Perturbed observations will be nudged into the system using an observation data set developed in the project.

An ensemble regional reanalysis using the combined data assimilation system will be carried out for a test period. To show feasibility for the pre-satellite era, a probabilistic dataset will be used to compensate for missing satellite data in this era.

The KF ensemble variational DA will be used with a 6-hour Kalman filter interval and continuous ensemble nudging between two Kalman filter initializations. The target resolution for the ensemble is 12 km ensuring high resolution uncertainty estimates for the European CORDEX domain (covering whole Europe). Boundary conditions will be provided by the ERA-20C or NOAA 20-CR reanalyses.

The produced regional ensemble reanalysis data will be evaluated against independent observations, e.g. unused satellite observations as used in the current HERZ regional reanalysis scheme. Probabilistic evaluation will contain standard matches for ensemble reliability and/or resolution, e.g. spread-skill relation, rank histograms, Brier/CRPS scores. Additional comparisons will be made against the high resolution deterministic HERZ regional reanalysis. Extensive evaluation of the reanalysis ensemble will be performed within UERRA WP3.

T2.1 - Ensemble-Variational DA Reanalysis [Months: 1-45]

MO

Ensemble Variational DA development: Development of a European area version of the Met Office Global Regional Ensemble Prediction System (MOGREPS – Bowler et al. 2008) and a regional version of the Met Office's coupled Ensemble-Variational Data Assimilation (EVDA) algorithm - Clayton et al. (2012). M1 - M36.

Ensemble Variational DA observations: Specific observation preparation for ensemble regional reanalysis, beyond that available from ERA-CLIM and UERRA WP1. M1 -M21.

Ensemble Variational DA production: An ensemble European regional reanalysis for the satellite era (1978-present). Production using MO HPC resources at ECMWF to start M15. M15 - M39

Ensemble Variational DA diagnostics: Diagnostics of quality of production, mean and uncertainty estimates. Deterministic and probabilistic diagnostics for production to start M15, ends M45.

T2.2 - Deterministic Reanalysis [Months: 1-48]

SMHI, MF

HARMONIE preparation: Prepare and test the HARMONIE RA with input, physiography and soil and two different physics schemes. Preparations and developments will start M1, end M4. Parallel runs with the two physics packages start M4 and end M9, (SMHI and MF, M1-M9)

HARMONIE production: European 11 km 3D-VAR atmospheric and surface reanalysis from 1961-present. Running the reanalysis, in 2 streams from ~1989 and from 1961-1989. (SMHI, M8 - M45)

T2.3 - Downscaling [Months: 1-36]

MF

WT3:

Work package description

MESCAN preparation: Setting up the processing reanalysis suite at ECMWF with archiving at Météo-France. (MF, M1- M6)

MESCAN Europe: 2D downscaling reanalysis over the entire Europe at 5.5 km from 1961. (MF, M1 - M45)

MESCAN ensemble: An ensemble surface analysis will be developed and evaluated for a short period (~5 years) over Europe with MESCAN (or MO's EUROPP system) using uncertainties derived from ensemble outputs in task 2.1 and/or observation network and perturbed observations. (MF, M12 - M36)

T2.4 - Cloud Fraction Reanalysis [Months: 12-24]

SMHI

MESAN cloud analysis: 2D analysis of cloud fraction for 30 years, at 5.5 km resolution 1982-2013.

T2.5 - Ensemble-Nudging DA Reanalysis [Months: 1-45]

UB

Kalman Filter Ensemble DA (KFENDA) observations: Generation of a probabilistic observation dataset in order to increase the density in observation sparse periods and regions which will be used in the ensemble nudging scheme. (UB, M1 - M9)

Kalman Filter Ensemble DA development: Development of an ensemble reanalysis system based on the DWD mesoscale numerical NWP model COSMO. (UB, M5 - M21).

KFENDA test: A feasibility study of a homogeneous European ensemble regional RA for the pre-satellite era. (UB, M21 - M35)

KFENDA diagnostics: Diagnostics of quality of KFEN uncertainty estimates. (UB, M36 - M45)

T2.6 - Reanalysis Cross-Evaluation [Months: 15-45]

MO, SMHI, DWD, UB

Evaluation of the Regional re-analyses: Evaluation of quality of EVDA/HARMONIE and KFENDA test mean and uncertainty estimates. Ensemble reanalysis uncertainties will be evaluated by comparing EVDA, HARM, and KFEN datasets against a) Each other and b) Global (ERA-CLIM). (MO, SMHI, UB, M15 - M45).

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	Task3 specific effort	Task4 specific effort	Task5 specific effort	Task6 specific effort	WP2 additional effort	WP2 TOTAL
1 - SMHI	0.00	71.00	0.00	7.00	0.00	4.00	0.00	82.00
2 - MF	0.00	2.00	50.00	0.00	0.00	0.00	0.00	52.00
3 - KNMI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 - MO	160.00	0.00	0.00	0.00	0.00	4.00	0.00	164.00
5 - UEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 - EDI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 - URV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 - NMA-RO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 - ECMWF	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 - DWD	0.00	0.00	0.00	0.00	0.00	3.00	0.00	3.00
11 - MI	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 - UB	0.00	0.00	0.00	0.00	44.00	3.00	0.00	47.00

WT3:

Work package description

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	Task3 specific effort	Task4 specific effort	Task5 specific effort	Task6 specific effort	WP2 additional effort	WP2 TOTAL
Total	160.00	73.00	50.00	7.00	44.00	14.00	0.00	348.00

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D2.1	Ensemble Variational DA development	4	50.00	Report	PU	21
D2.2	Ensemble Variational DA observations	4	30.00	Report	PU	24
D2.3	Ensemble Variational DA diagnostics	4	50.00	Report	PU	30
D2.4	Ensemble Variational DA documentation	4	30.00	Report	PU	42
D2.5	HARMONIE physics ensemble	1	12.00	Report	PU	12
D2.6	HARMONIE initial production	1	36.00	Report	PU	30
D2.7	HARMONIE production datasets	1	25.00	Report	PU	45
D2.8	MESCAN downscaling	2	40.00	Report	PU	45
D2.9	MESCAN ensemble	2	10.00	Report	PU	30
D2.10	MESCAN cloud analysis	1	7.00	Report	PU	24
D2.11	Kalman Filter Ensemble DA observations	12	10.00	Report	PU	15
D2.12	Kalman Filter Ensemble DA development	12	20.00	Report	PU	21
D2.13	Kalman Filter Ensemble DA diagnostics	12	14.00	Report	PU	45
D2.14	RA uncertainty evaluation	4	14.00	Report	PU	45
		Total	348.00			

Description of deliverables

D2.1 : Development of ensemble-variational data assimilation capability and report demonstrating ensemble uncertainty products (MO, 50 pm) [month 21]

D2.2 : Report of observations and datasets assembled for the ensemble-based variational assimilation (MO 30 pm) [month 24]

D2.3 : Preliminary report with ensemble diagnostics (MO 50 pm) [month 30]

D2.4 : Ensemble diagnostics report and documentation (MO 30 pm) [month 42]

D2.5 : Report of results and datasets of two physics HARMONIE runs for spread estimation (SMHI 10 pm, MF 2 pm) [month 12]

D2.6 : Preliminary report of the first period of the RA (SMHI 36 pm) [month 30]

D2.7 : HARMONIE reanalysis report of results and dataset (SMHI 25 pm) [month 45]

WT3:

Work package description

D2.8 : MESCAN reanalysis dataset and report 1961-present (MF 40 pm) [month 45]
D2.9 : Ensemble surface reanalysis report (MF 10 pm) [month 30]
D2.10 : UERRA-MESA-CL 30-year European cloud fraction dataset and report (SMHI 7 pm) [month 24]
D2.11 : Probabilistic observations will be generated for Kalman Filter ensemble DA and a report will be written (UB 10 pm) [month 15]
D2.12 : The KF ensemble reanalysis (KFENDA) system will be developed and with a report demonstrating reanalysis uncertainty capability (UB 20 pm) [month 21]
D2.13 : KFENDA ensemble diagnostics report and documentation (UB 15 pm) [month 45]
D2.14 : RA uncertainty evaluation: EVDA/HARMONIE/KFENDA uncertainty evaluation report (SMHI 4 pm, MO 4 pm, DWD 3 pm, UB 3 pm) [month 45]

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
MS4	Preliminary EVDA dataset available for preliminary evaluation studies	4	24	RA data archived
MS5	EVDA ensemble reanalysis raw dataset	4	42	RA data archived
MS6	HARMONIE reanalysis dataset stream 1	1	36	RA data archived
MS7	KFENDA Observation dataset	12	9	RA ensemble data archived
MS8	KFENDA test homogeneous ensemble reanalysis raw test dataset	12	40	RA ensemble data archived

WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP3	Type of activity ⁵⁴	RTD
Work package title	Assessing uncertainties by evaluation against independent observational datasets		
Start month	1		
End month	48		
Lead beneficiary number ⁵⁵	10		

Objectives

- To evaluate deterministic, ensemble reanalyses and downscaled reanalyses through comparison to ECV datasets, that were derived independently
- To establish a consistent knowledge base on the uncertainty of reanalyses across all of Europe, by adopting a common evaluation procedure for ECVs, derived climate indicators, extremes and scales of variability that are of particular interest to users
- To statistically assess the provided information over Europe by applying the common evaluation procedure to the reanalyses products, gridded datasets and satellite data
- To apply the common evaluation procedure for special climate features of selected sub-regions of Europe, providing feedback on the reliability of measures of uncertainty contained in reanalyses
- To synthesize the results of the evaluation into a general assessment of the reliability and uncertainty of regional reanalysis that guides users in the state-of-the-art application of the datasets produced in WP2

Description of work and role of partners

WP3 - Assessing uncertainties by evaluation against independent observational datasets [Months: 1-48] **DWD**

The assessment and quantification of uncertainties is crucial for the interpretation of the reanalysis products and their proper use in applications and downstream services. In this work package, the information content of the regional reanalyses (from WP2) and their uncertainties are statistically assessed by comparison against independent or different ECV datasets at the user relevant scales. The reference datasets include satellite-derived data for climate monitoring, and gridded datasets based on high-density station series (from WP1) together with their uncertainty estimates.

T3.1 - Coordinated uncertainty evaluation [Months: 1-48]

DWD, KNMI, MO, UEA, EDI, NMA-RO, MI

Evaluation preparation: Definition of a common evaluation procedure that can be applied to the different re-analysis products (deterministic, ensemble and downscaled). This procedure will be applied similarly with reference datasets at the European-scale (in-situ grids and satellite-derived datasets), for special climate features at high resolution in sub-regions and for third-party national evaluation activities, ensuring comparability of results and targeting of user needs. Identification of a set of ECVs, derived indices and time and space scales of primary interest, agreement on a minimum subset of regional reanalyses products for which a distributed evaluation (including external participants) is practically feasible, and definition of a minimum set of evaluation scores, considering spatial-temporal, probabilistic and multi-variate measures, e.g., systematic and random errors, frequency distributions, extreme values, variability and trends, correlations in time and space, cross-correlation between ECVs (UEA, KNMI, DWD) and concepts of probabilistic forecast verification (EDI, MO, DWD). Link with user-oriented partners from WP4 (DWD, indicators of primary interest, downstream use of uncertainties), with partners from WP1 (UEA and KNMI, uncertainties in reference datasets), from WP2 (MO, data producers, evaluation procedures, interpretation of reanalysis data) and with third party participants of WP4.3 (KNMI, in kind contributions to basic evaluation). (KNMI, MO, UEA, EDI, NMA-RO, DWD, MI, M1 - M15) Evaluation synthesis: Develop a synthesis of knowledge achieved from all evaluation activities on the uncertainty of regional reanalyses in light of applications and translated into a language that is understood by users. Include European scale analysis

WT3:

Work package description

as well as climate features and sub-regions of special interest. Shall help users in the state-of-the-art application of the datasets developed in WP2.

T3.2 - Assessing uncertainties over the European domain [Months: 15-45]

KNMI, UEA, EDI, NMA-RO, DWD, MI

Evaluation over Europe: Evaluation of the WP2 reanalysis uncertainties using the common evaluation procedures (task 3.1) comparing against a) satellite-based ECVs and b) gridded observations.

a) Reanalysis products (from WP2) such as cloud coverage, solar radiation, precipitation over ocean are compared against CM-SAF and SMHI satellite data sets (by KNMI and DWD), further satellite data sets to be investigated with respect to their fitness for regional reanalysis uncertainty characterization include data sets from: ESA CCI Cloud, ESA CCI Soil Moisture, DUE GlobAlbedo, DUE GlobSnow (snow extend and snow water equivalent), and DUE GlobTemperature (by DWD and KNMI).

b) Reanalysis products (from WP2) such as precipitation, temperature and snow are compared against gridded observation data from WP1 (by KNMI, UEA), against GPCC precipitation (by DWD) and against national/subregional gridded datasets for the Alps (by EDI) and Scandinavia (by MI). Drought indices will be derived from the reanalysis products (from WP2) and compared to the drought indices derived from the gridded observation data (by NMA-RO).

As this covers the area with and without satellite observations, the evaluation should provide a basis for assessing quality and uncertainties in the reanalysis data prior to the satellite era.

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	WP3 additional effort	WP3 TOTAL
1 - SMHI	0.00	0.00	0.00	0.00
2 - MF	0.00	0.00	0.00	0.00
3 - KNMI	6.00	15.00	0.00	21.00
4 - MO	2.00	0.00	0.00	2.00
5 - UEA	2.00	3.00	0.00	5.00
6 - EDI	1.00	6.00	0.00	7.00
7 - URV	0.00	0.00	0.00	0.00
8 - NMA-RO	1.00	3.00	0.00	4.00
9 - ECMWF	0.00	0.00	0.00	0.00
10 - DWD	15.00	22.00	0.00	37.00
11 - MI	4.00	5.00	0.00	9.00
12 - UB	0.00	0.00	0.00	0.00
Total	31.00	54.00	0.00	85.00

WT3:

Work package description

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D3.1	Definition Workshop	10	7.00	Other	PU	3
D3.2	Evaluation procedures	10	2.00	Report	PU	6
D3.3	Programme package	10	13.00	Other	PU	15
D3.4	Evaluation experiences	10	4.00	Report	PU	24
D3.5	Preliminary assessment	10	12.00	Report	PU	34
D3.6	Scientific assessment	10	23.00	Report	PU	45
D3.7	Synthesis Workshop	10	8.00	Other	PU	45
D3.8	User synthesis	3	16.00	Report	PU	48
		Total	85.00			

Description of deliverables

D3.1 : Workshop on the definition of a common evaluation procedure (KNMI 1pm, MO 1 pm, UEA 1 pm, EDI 1 pm, NMA-RO 1 pm, DWD 1 pm, MI 1 pm) [month 3]

D3.2 : Preliminary table summarizing common evaluation procedures shared among WP3 partners via email (KNMI 1 pm, DWD 1 pm) [month 6]

D3.3 : A portable starting set of algorithms (suggested to be programmed in R) to support the common evaluation procedure (DWD 10 pm, KNMI 1 pm, MI 2 pm) [month 15]

D3.4 : Table summarizing the so far applied common evaluation procedures and sharing of first experiences among WP3 partners via email (KNMI 2 pm, DWD 2 pm) [month 24]

D3.5 : Preliminary report of assessment of the first period of the RA (KNMI 2 pm, MO 1 pm, DWD 7 pm, MI 2 pm, UEA, EDI) [month 34]

D3.6 : Scientific report on assessment of regional analysis against independent data sets (KNMI 6 pm, MO, UEA 3 pm, EDI 3 pm, NMA-RO 1 pm, DWD 8 pm, MI 2 pm) [month 45]

D3.7 : Workshop on the synthesis of evaluation results (KNMI 2 pm, MO, UEA 1 pm, EDI 1 pm, NMA-RO 1 pm, DWD 2 pm, MI 1 pm) [month 45]

D3.8 : User friendly synthesis report on evaluation and uncertainty of regional reanalyses (KNMI 6 pm, MO, UEA, EDI 2 pm, NMA-RO 1 pm, DWD 6 pm, MI 1 pm) [month 48]

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
MS9	Common evaluation procedures (first version) from UERRA-EVAL-PREP for use in WP3 agreed on	10	6	Preliminary table summarizing common evaluation procedures shared among WP3 partners via email

WT3:

Work package description

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
MS10	First experiences from UERRA-EVAL-EUROPE shared among WP3 partners via email	10	24	Table summarizing the so far applied common evaluation procedures and sharing of first experiences among WP3 partners via email

WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP4	Type of activity ⁵⁴	RTD
Work package title	Facilitating downstream services (data, derived products and outreach)		
Start month	1		
End month	48		
Lead beneficiary number ⁵⁵	3		

Objectives

- To make available the reanalysis data to a large number of users and link in an optimal way to existing data and visualization portals or portals that are being developed in parallel projects, for scientific and policy use
- To explore how the reanalysis data are best exploited for development of user-oriented products such as derived climate indicators, to use these for assessing the key characteristics of climate change in Europe, and to quantify the uncertainties which are most relevant to the development and assessment of policies
- To link the activities on reanalysis and observation products with other projects from this call, in particular CLIPC ("Provision of access to simulated and observed climate datasets and climate indicator toolbox")

Description of work and role of partners

WP4 - Facilitating downstream services (data, derived products and outreach) [Months: 1-48]

KNMI

This workpackage is oriented towards the downstream use of the reanalyses data. The focus is on "how best to utilize this additional information for understanding past climates and climate change".

It builds on, and uses as far as possible, the data dissemination and visualisation work performed in EURO4M, and web portals and tools developed elsewhere, particularly at ECMWF, where ERA reanalysis data and TIGGE multi-model ensemble data are distributed.

Working with all partners in WP1, WP2 and WP3 the requirements for connectivity to existing portals will be assessed, capitalising on the benefits associated with an adherence to standards (e.g. Open GIS Consortium developments, ISO19100 series, Geographical Markup Language), interoperability and consolidation. This includes the use of ESG, OPeNDAP, NetCDF, and WMS. This task will investigate what needs to be done and together with the dataset developers in WP1 and WP2 will implement these requirements.

User requirements and input will be taken in through the Workshop and other user contacts in WP8.

This work package will use the ensemble of reanalyses to derive frequently used climate indices and indicators and to assess their uncertainty. The goal is to explore how the reanalysis data are best exploited to develop user oriented products such as derived climate indicators and how best to utilize this additional information for understanding past climates and climate change in Europe.

Some example products will be developed. All indicator information will be updated every month using newly available reanalysis and observational data.

T4.1 - Establishing Data services [Months: 1-48]

ECMWF, KNMI

MARS data: Data services through the MARS archive at ECMWF will be built up from the TIGGE-LAM project. This archive will hold subsets of every reanalysis dataset produced in WP2, stored in a common format (but still using the original grid and resolution).

ESGF data: Data services through ESGF Data Nodes for users outside the meteorological community, liaising with the CLIPC project. For each dataset the work required will be slightly different because the native archive for nearly each dataset is different.

WT3:

Work package description

T4.2 - User-oriented products [Months: 1-48]

KNMI, SMHI, MF

Indices for European area: Set of derived indices (including uncertainty information) based on the RA data.

All indicator information will be updated every month using newly available reanalysis and observational data. The trends in the indicators will be assessed.

HYPE-SURFEX-TRIP for European area: Evaluating the quality of precipitation in the different RA through high-resolution large-scale hydrological models, using discharge data to provide feedback on simulated precipitation fields. The SMHI hydrological model for Europe, E-HYPE will be set up and run from RA data of SMHI, MO, MF and possibly DWD. The MESCAN reanalysis will be used by MF to drive the surface module (SURFEX). The drainage and run-off computed will be used to force the hydrological model TRIP to compute river discharge. Results will be compared with EU-HYPE.

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	WP4 additional effort	WP4 TOTAL
1 - SMHI	0.00	8.00	0.00	8.00
2 - MF	0.00	14.00	0.00	14.00
3 - KNMI	10.00	10.00	0.00	20.00
4 - MO	0.00	0.00	0.00	0.00
5 - UEA	0.00	0.00	0.00	0.00
6 - EDI	0.00	0.00	0.00	0.00
7 - URV	0.00	0.00	0.00	0.00
8 - NMA-RO	0.00	0.00	0.00	0.00
9 - ECMWF	22.00	0.00	0.00	22.00
10 - DWD	0.00	0.00	0.00	0.00
11 - MI	0.00	0.00	0.00	0.00
12 - UB	0.00	0.00	0.00	0.00
Total	32.00	32.00	0.00	64.00

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D4.1	MARS archives	9	18.00	Other	PU	48
D4.2	Data plan	3	6.00	Other	PU	12
D4.3	Visualisation	9	2.00	Prototype	PU	12
D4.4	ESGF	3	8.00	Other	PU	36
D4.5	Climate indices	3	8.00	Other	PU	48
D4.6	HYPE report	1	6.00	Report	PU	10

WT3:

Work package description

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D4.7	Hydrological evaluation	1	2.00	Report	PU	45
D4.8	TRIP evaluation	2	14.00	Report	PU	45
		Total	64.00			

Description of deliverables

D4.1 : Subset of reanalyses in MARS at ECMWF (ECMWF 18 pm) [month 48]

D4.2 : Data plan: INSPIRE compliant data dissemination plan and hand over to CLIPC (KNMI 4 pm, ECMWF 2 pm) [month 12]

D4.3 : Data services and visualisation prototype (ECMWF 2 pm) [month 12]

D4.4 : Implementation of ESGF (Earth System Grid Federation) node for at least one UERRA dataset (KNMI 8 pm) [month 36]

D4.5 : Indices based on reanalysis data, including uncertainty information (KNMI 8 pm) [month 48]

D4.6 : HYPE EURO4M evaluation report (SMHI 6 pm) [month 10]

D4.7 : HARMONIE and MESCOAN Europe and MO RA hydrological evaluation report (SMHI 2 pm) [month 45]

D4.8 : Evaluation report TRIP river discharge (MF 14 pm) [month 45]

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
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WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP5	Type of activity ⁵⁴	MGT
Work package title	Consortium Management		
Start month	1		
End month	48		
Lead beneficiary number ⁵⁵	1		

Objectives

- Provide the overall legal, ethical, financial and administrative management of the project to ensure aims of the project are efficiently and effectively met, on time and with the resources budgeted
- Coordinate and facilitate effective communication between the consortium and the REA in legal, ethical, financial and administrative issues
- Organize meetings relating to the Consortium Management

Description of work and role of partners

WP5 - Consortium Management [Months: 1-48]

SMHI

The consortium management overviews all legal, ethical, financial and administrative activities, regarding timing, content and quality. The consortium management also establishes the channels of communication between the partners, as well as between the consortium and the REA in related issues. This WP also organizes meetings relating to the management of the project.

T5.1 - Management [Months: 1-48]

SMHI

This task includes the following (non-exhaustive) activities:

- Overall legal, financial, administrative management and reporting
- Maintenance of the Consortium Agreement and handling of other legal issues
- Handling of the project correspondence and day-to-day requests from partners and external bodies
- Implementing and maintaining of a project-specific database for reporting and controlling, including the adaptation of the structure after changes in the workplan and the consortium
- Implementing competitive calls for the participation of new beneficiaries
- Maintaining the project infrastructure, e.g the internal platform for information exchange and email lists
- Any other management activities foreseen by the REA Grant Agreement annexes, except coordination of research and technological development activities

T5.2 - Financial reporting, Communication and interfacing with REA [Months: 1-48]

SMHI

Timely and good quality reports on the financial progress of the project and interfacing with the REA will be the responsibility of the coordinator. The coordinator will be the single contact point for the REA and for strategic issues outside the project. This task will ensure the appropriate follow-up of specific obligations deriving from the REA Grant Agreement, in terms of reporting (financial results), communication and general management procedures. It will inform the REA of project achievements and any deviations from the agreed plans. In case of major difficulty; it will carry out a dialogue with the REA in order to find the appropriate solution. The establishment of routines will ensure efficient communication between and among the project partners, the associated experts, the REA and other partners. This task also include scheduling, organizing, chairing and follow up of General Assembly meetings and other meetings relating to management.

WT3:

Work package description

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	WP5 additional effort	WP5 TOTAL
1 - SMHI	2.00	6.00	0.00	8.00
2 - MF	0.00	0.00	0.00	0.00
3 - KNMI	0.00	0.00	0.00	0.00
4 - MO	0.00	0.00	0.00	0.00
5 - UEA	0.00	0.00	0.00	0.00
6 - EDI	0.00	0.00	0.00	0.00
7 - URV	0.00	0.00	0.00	0.00
8 - NMA-RO	0.00	0.00	0.00	0.00
9 - ECMWF	0.00	0.00	0.00	0.00
10 - DWD	0.00	0.00	0.00	0.00
11 - MI	0.00	0.00	0.00	0.00
12 - UB	0.00	0.00	0.00	0.00
Total	2.00	6.00	0.00	8.00

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D5.1	GA and REA meetings	1	4.00	Report	PU	48
		Total	4.00			

Description of deliverables

D5.1 : GA and REA meetings [month 48]

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
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WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP6	Type of activity ⁵⁴	RTD
Work package title	Scientific Coordination		
Start month	1		
End month	48		
Lead beneficiary number ⁵⁵	1		

Objectives

- Provide effective management to achieve project objectives on time, to cost and at a high quality level
- Ensure that the project prepares all results and deliverables in due time and good quality
- Ensure the scientific interaction with the REA, consultation with the External Scientific Advisory Board (ESAB) and represent the project towards external parties
- Manage the scientific progress by ensuring good internal communication and regular meetings with the WP leaders (MST)

Description of work and role of partners

WP6 - Scientific Coordination [Months: 1-48]

SMHI

The tasks below will primarily be the responsibility of the UERRA Science Coordinator who provides the scientific leadership for the project.

T6.1 - Scientific reviews and reporting [Months: 1-48]

SMHI

Timely and good quality reports on the scientific progress of the project and interfacing with the REA will be the responsibility of the coordinator and he will be assisted by allocated scientists in the WP. The scientific parts of the reporting will be collected and compiled for submission to REA. Scientific issues will be followed up and reviewed and presented to the REA.

This task will ensure the specific obligations deriving from the REA Grant Agreement, in terms of reporting on science-results communication and general management procedures. It will inform the REA of project achievements and any deviations from the agreed plans, In case of major difficulty; it will carry out a dialogue with the REA in order to find the appropriate solution. The establishment of routines will ensure efficient communication between and among the project partners, the associated experts, the REA and other partners.

T6.2 - Scientific management and internal communication [Months: 1-48]

SMHI

The Coordinator will closely monitor the scientific progress and follow up through regular MST meetings (telephone or in connection with other meetings). News about the project will be published on the UERRA web site with news items and newsletters.

The Coordinator will schedule, organize, chair and follow up the Kick-off meeting.

The WP scientific meetings will be attended as much as possible.

The Coordinator will represent UERRA in external meetings and conferences.

WT3:

Work package description

T6.3 - Ensure the appropriate level of consultation with the External Scientific Advisory Board (ESAB)

[Months: 1-48]

SMHI

It is essential and helpful for the project that it receives independent advice and feedback from the ESAB, both on the scientific progress and on the technical and user oriented aspects. Also the bridge towards a future Copernicus climate change service will be aided by the expert advice. The Coordinator and the Project Administration will ensure that consultations and meetings are organised in an efficient manner and that the Board receives appropriate information and that the subsequent recommendations of the ESAB are acted on.

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	Task3 specific effort	WP6 additional effort	WP6 TOTAL
1 - SMHI	4.00	4.00	1.00	0.00	9.00
2 - MF	0.00	0.00	0.00	0.00	0.00
3 - KNMI	0.00	0.00	0.00	0.00	0.00
4 - MO	0.00	0.00	0.00	0.00	0.00
5 - UEA	0.00	0.00	0.00	0.00	0.00
6 - EDI	0.00	0.00	0.00	0.00	0.00
7 - URV	0.00	0.00	0.00	0.00	0.00
8 - NMA-RO	0.00	0.00	0.00	0.00	0.00
9 - ECMWF	0.00	0.00	0.00	0.00	0.00
10 - DWD	0.00	0.00	0.00	0.00	0.00
11 - MI	0.00	0.00	0.00	0.00	0.00
12 - UB	0.00	0.00	0.00	0.00	0.00
Total	4.00	4.00	1.00	0.00	9.00

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D6.1	Coordination plan	1	1.00	Report	PU	8
D6.2	MST meetings and minutes	1	2.00	Other	PU	48
D6.3	ESAB meetings	1	1.00	Other	PU	48
		Total	4.00			

Description of deliverables

D6.1 : Coordination plan (SMHI 1 pm) [month 8]

D6.2 : MST meetings and minutes (SMHI 2 pm) [month 48]

WT3:

Work package description

D6.3 : Holding the meetings with the ESAB and assembling reports and taking account of it in the project (SMHI 1 pm) [month 48]

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
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WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP7	Type of activity ⁵⁴	OTHER
Work package title	Dissemination & Outreach		
Start month	1		
End month	48		
Lead beneficiary number ⁵⁵	1		

Objectives

- Ensure the interaction with the EC via REA
- Represent the project towards external parties
- Management of dissemination of the project on regional, national, EU- and International level
- To connect to the climate change community and the ongoing Copernicus projects and downstream services, to inform them on the developed RA and observation products, and to get relevant feedback for the project
- To work on capacity development closely with EU candidate countries and developing countries, which will be among the largest potential beneficiaries of international co-operation in climate services
- Prepare high quality dissemination material and organize a final event

Description of work and role of partners

WP7 - Dissemination & Outreach [Months: 1-48]

SMHI

The progress and the results from UERRA will at regular intervals be communicated with the EC via REA. There will be full reports, but also newsletters and information via the UERRA web site.

Policy makers within the EU institutions will be informed and a dialogue established.

As part of this WP, a connection to the climate change community (including ESA-CCI) and the Copernicus-related projects (GEOLAND2, CRYOLAND, MYOCEAN2) will be established to inform them on the developed reanalyses and observation products, and to get relevant feedback for the project.

Remaining information gaps will be closed by generation and evaluation of specific surveys. Actors in the relevant core and downstream Copernicus services and in related national and international programmes will be actively involved in this process. The lessons learned from the process for establishing user needs will be considered too.

This WP will provide the UERRA input for the work in WP9 (Overarching coordination FP7 Copernicus climate change projects).

T7.1 - Dissemination [Months: 1-48]

SMHI, KNMI

UERRA will create a project identity (branding, graphical logo) to be used in all publicity activities. We will set up and maintain a Web Portal with a public and a private section. The latter will be used for internal project communication and document exchange.

The primary dissemination channels for achievements in UERRA will be peer-reviewed scientific literature, a project leaflet, and 6-monthly electronic newsletters. Project partners will make regular contributions to national and international conferences.

At the start of the project a dissemination plan will be made, following discussions at the kick-off meeting. Detailed dissemination activities, with timings and identified target groups will be laid down.

This task will have a close link to WP4 where work on data dissemination, products and links to users is the focus. There will be a user group with European NHMSs and interaction with policy makers and support to climate change monitoring and adaptation policy makers. Through these channels partners will maintain an active dialogue with the international Climate research community, both informing on UERRA activities and contributing to the development

WT3:

Work package description

of future coordinated activities in climate research. In year 3, UERRA will organize a show case event where project results will be demonstrated and future directions for reanalysis discussed.

News about the project will be published on the UERRA web site with news items and newsletters. The Coordinator will represent UERRA in external meetings and conferences.

T7.2 - Outreach and capacity development [Months: 1-48]

DWD, KNMI

Policy outreach: EEA/JRC contacts and Brussels policy briefs. Connect to the climate change community through bilateral contacts (EEA/JRC) and working with the coordinator of the CORE-CLIMAX coordination project to contribute to his report about the links between new and ongoing FP7 projects (DWD, KNMI). Hold 3 policy briefs in Brussels during the course of the project (M18, M33, M48). They will be drafted from a policy perspective point of view in a non-technical language and not more than two pages in length and with an attractive layout. (KNMI 4 pm)

GFCS outreach: Contribution to workshops in Africa, held together with the ETCCDI and WMO (KNMI). DWD will develop training material in order to promote the benefit of integrated use of climate data. (DWD 4 pm)

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	WP7 additional effort	WP7 TOTAL
1 - SMHI	4.00	0.00	0.00	4.00
2 - MF	0.00	0.00	0.00	0.00
3 - KNMI	1.00	4.00	0.00	5.00
4 - MO	0.00	0.00	0.00	0.00
5 - UEA	0.00	0.00	0.00	0.00
6 - EDI	0.00	0.00	0.00	0.00
7 - URV	0.00	0.00	0.00	0.00
8 - NMA-RO	0.00	0.00	0.00	0.00
9 - ECMWF	0.00	0.00	0.00	0.00
10 - DWD	0.00	4.00	0.00	4.00
11 - MI	0.00	0.00	0.00	0.00
12 - UB	0.00	0.00	0.00	0.00
Total	5.00	8.00	0.00	13.00

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D7.1	General dissemination plan	1	2.00	Report	PU	3
D7.2	Training material	10	2.00	Report	PU	48
D7.3	EU brief I	3	1.00	Other	PU	18

WT3:

Work package description

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D7.4	EU brief II	3	1.00	Other	PU	33
D7.5	EU brief III	3	1.00	Other	PU	48
D7.6	Web site	1	1.00	Other	PU	15
D7.7	Newsletters	1	1.00	Report	PU	36
D7.8	UERRA event	1	1.00	Other	PU	32
D7.9	African workshop	3	1.00	Other	PU	24
		Total	11.00			

Description of deliverables

D7.1 : General dissemination plan (SMHI 1 pm, KNMI 1 pm) [month 3]

D7.2 : Training material on the use of reanalysis in climate services resulting from the workshop (DWD 2 pm) [month 48]

D7.3 : EU brief I: Brief about the objectives in the project for derived products describing climate change in Europe for policymakers at European level (KNMI 0,5 pm) [month 18]

D7.4 : EU brief II: Briefs about the progress in UERRA and in particular the derived products describing climate change in Europe for policymakers at European level (KNMI 1 pm) [month 33]

D7.5 : EU brief III: Briefs about the progress in UERRA and in particular the derived products describing climate change in Europe for policymakers at European level ((KNMI 1 pm) [month 48]

D7.6 : UERRA web site scientific news (SMHI 1 pm) [month 15]

D7.7 : Web site annual newsletters (SMHI 1 pm) [month 36]

D7.8 : UERRA show case Event (SMHI 1 pm) [month 32]

D7.9 : African workshop: Contribution to a climate change capacity building workshops in Africa in the framework of the GFCS (KNMI 1 pm) [month 24]

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
MS11	Reanalysis based products included in EEA and JRC reports/websites, in particular Eye On Earth (eyeonearth.org) and Climate Adapt (climate-adapt.eea.europa.eu)	3	48	Reports / website contain UERRA RA products

WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP8	Type of activity ⁵⁴	OTHER
Work package title	User feedback		
Start month	1		
End month	48		
Lead beneficiary number ⁵⁵	3		

Objectives

- To involve third-party data providers and climate service developers to provide guidance on the use of the ensembles of RA including the associated uncertainties, to get feedback from these 'early adopters' and to facilitate evaluation of the reanalysis ensemble using independent national observation data
- To come up with guidelines on usage of the RA products and their uncertainties

Description of work and role of partners

WP8 - User feedback [Months: 1-48]

KNMI

This work package will facilitate that external partners are given early access to the UERRA and EURO4M data in order to evaluate the use of regional reanalysis data and products and their uncertainties. These third-party partners are data providers and climate service developers themselves. They will include the NMHSs which collaborate in the EUMETNET Climate Programme. Dedicated data evaluation workshops will be organized to get feedback from these 'early adopters'. The workshops will provide guidance and feedback on the use of the ensembles of reanalyses including the associated uncertainty products.

As a potential future Copernicus service on climate change monitoring, UERRA must interface directly with the full range of intermediate- and end-user requirements, including disaster prevention, health, energy, water resources, ecosystems, forestry agriculture, transport, tourism and biodiversity.

The stakeholders (impact community and decision makers) needs in terms of climate data and products cover a large range of raw or derived variables, indicators, spatial and temporal scales, uncertainty assessment at various levels of complexity. The stakeholder community is however diverse and not well organized. This will make it difficult to obtain uniform feedback for the multi-purpose products. This activity will start from the review of existing user consultation reports performed in EURO4M and the associated meta user-requirement document produced.

The workshops also provide the opportunity to facilitate evaluation of the reanalysis ensemble using independent (and often access restricted) national observational data brought in by third-party participants. Together with WP3, this effort will assess whether the reanalysis data are fit for their intended use.

T8.1 - Third-party evaluation of reanalyses data and products [Months: 1-48]

KNMI, DWD

Third party Workshops: Facilitate that external partners are given early access to the UERRA and EURO4M data in order to evaluate the use of regional RA data and derived products and their uncertainties. A dedicated data workshop will be organized by KNMI together with DWD for the evaluation and to get feedback from early adopters first, in the middle of the project (using the first products from the newly developed reanalysis ensemble). Policy makers and stakeholders at national as well as European levels will be invited to the workshop to get early indications of the user requirements.

On the basis of the evaluation material and guidance developed in WP3, this effort will assess whether the reanalysis data are fit for their intended use. Prior to the workshop, dedicated presentations at national workshops/conferences will be given in order to collect and evaluate user requirements. A second workshop will be held during the last year of the project in order to embrace the feedback from users into a guidance on the use of the RA data.

WT3:

Work package description

Policy makers will be involved in the workshop and their evaluations will be important for the conclusions. Those conclusions will be included into the guidance documents.

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	WP8 additional effort	WP8 TOTAL
1 - SMHI	0.00	0.00	0.00
2 - MF	0.00	0.00	0.00
3 - KNMI	8.00	0.00	8.00
4 - MO	0.00	0.00	0.00
5 - UEA	0.00	0.00	0.00
6 - EDI	0.00	0.00	0.00
7 - URV	0.00	0.00	0.00
8 - NMA-RO	0.00	0.00	0.00
9 - ECMWF	0.00	0.00	0.00
10 - DWD	4.00	0.00	4.00
11 - MI	0.00	0.00	0.00
12 - UB	0.00	0.00	0.00
Total	12.00	0.00	12.00

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D8.1	Initial review of user requirements	3	2.00	Report	PU	12
D8.2	User Workshop I	3	2.00	Other	PU	24
D8.3	Concluding User Workshop	3	2.00	Other	PU	42
D8.4	User guidance	3	4.00	Other	PU	48
		Total	10.00			

Description of deliverables

D8.1 : A plan and initial review of existing user consultation reports will be made early in the project (KNMI 1 pm, DWD 1 pm) [month 12]

D8.2 : First Workshop involving external climate service providers (KNMI 1 pm, DWD 1 pm) [month 24]

D8.3 : Second Workshops involving external climate service providers (KNMI 1 pm, DWD 1 pm) [month 42]

D8.4 : Guidance material (report) as a result of the second workshop (KNMI 4 pm) [month 48]

WT3:

Work package description

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
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WT3:

Work package description

Project Number ¹	607193	Project Acronym ²	UERRA
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One form per Work Package

Work package number ⁵³	WP9	Type of activity ⁵⁴	OTHER
Work package title	Overarching Coordination FP7 Copernicus climate change projects		
Start month	1		
End month	48		
Lead beneficiary number ⁵⁵	3		

Objectives

- Coordination activity among the five FP7 projects from the 2013 FP7 space call (ERA-CLIM2, UERRA, QA4ECV, CLIPC, EUCLEIA)
- Coordinated information exchange between the five FP7 projects and the outside world
- Coordinated approach to relevant Commission DGs
- Joint stakeholder liaison activities

Description of work and role of partners

WP9 - Overarching Coordination FP7 Copernicus climate change projects [Months: 1-48]

KNMI

ERA-CLIM2, UERRA, QA4ECV, CLIPC and EUCLEIA are acronyms for five FP7 projects from the 2013 FP7 space call that all share the common objective to prepare for a future operational Copernicus Climate Change Service. To ensure a proper coordination among these projects, there is the need to have an overarching coordination among these projects. This overarching coordination will be embedded in each individual DoW as a separate WP named "Overarching coordination between FP7 Copernicus climate change projects".

The overarching coordination team consists of the Coordinators of the five projects and will itself be coordinated by Dr. Albert Klein Tank of KNMI which will attend project Assembly meetings where possible and desired. Note that the role assigned to Dr. Albert Klein Tank is that of facilitator rather than supervisor and that KNMI has been chosen as it is partner in four out of the five projects.

T9.1 - Information exchange and ideas among the five projects [Months: 1-48]

SMHI, KNMI

This task will focus on the exchange of information and ideas among the projects. A coordination plan will be prepared by the coordination team to detail the specific actions to be undertaken by the projects. It will be maintained and updated during the life time of the projects (Dx.1). This plan will cover also the optimal arrangements for data exchange and data services to be developed as part of each project (according to the DoWs).

T9.2 - Coordination meetings organization [Months: 1-48]

KNMI

This task will be in charge of organising teleconferences on a 6-monthly basis.

A first joint meeting will be organised at the premises of REA in Brussels after the kick-off of all the projects.

Additional physical meetings (possibly replacing a teleconference) may be organised upon REA's or Coordinators' request. Where possible, these meetings will be organised in combination with project Assembly meetings to limit travel costs.

T9.3 - Common web page [Months: 1-48]

WT3:

Work package description

SMHI

A common web page which links to the individual project websites will be created and maintained. The system support will be provided within CLIPC WP3. Designated staff from all projects will be able to edit content and upload documents. There will be both public areas and a protected area for exchange of information among the CCCS5 projects. This task will provide editorial support for these pages.

T9.4 - Liaising activities with potential users and other stakeholders including ESA [Months: 1-48]

KNMI, SMHI

This task will assess the options for common approaches for liaising with potential users and other stakeholders, including ESA-CCI projects, etc. This includes coordination of surveys, workshops, meetings, and preparation of common outreach material. Taking into account the differences in planning of the five projects common approaches will avoid overburdening stakeholders. Joint efforts will also increase the possibilities for stakeholder liaison.

T9.5 - Coordination activity and meetings with the European Commission [Months: 1-48]

SMHI

The task will focus in organizing coordinated input and meetings with the European Commission directorates linked to the development of the Copernicus Climate Change Service (DG ENTR) or other Climate Services (DG CLIMA, EEA). This activity aims at discussing common elements and guarantee adequate representation of each individual project. It will help to communicate a coordinated message, rather than five distinct messages from the five projects. This applies to general policy related meetings at commission level only; communication with the Commission on project specific elements will be managed at the project level.

Additional tasks may follow during the course of the projects.

Person-Months per Participant

Participant number and short name ¹⁰	Task1 specific effort	Task2 specific effort	Task3 specific effort	Task4 specific effort	Task5 specific effort	WP9 additional effort	WP9 TOTAL
1 - SMHI	1.00	0.00	1.00	1.00	1.00	0.00	4.00
2 - MF	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3 - KNMI	1.00	2.00	0.00	1.00	0.00	0.00	4.00
4 - MO	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5 - UEA	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6 - EDI	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7 - URV	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8 - NMA-RO	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 - ECMWF	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10 - DWD	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11 - MI	0.00	0.00	0.00	0.00	0.00	0.00	0.00
12 - UB	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	2.00	2.00	1.00	2.00	1.00	0.00	8.00

WT3:

Work package description

List of deliverables

Deliverable Number ⁶¹	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature ⁶²	Dissemination level ⁶³	Delivery date ⁶⁴
D9.1	Plan of activities	3	1.00	Other	PU	36
D9.2	Web portal	1	1.00	Other	PU	6
D9.3	Lessons learned	3	3.00	Other	PU	24
D9.4	Meeting minutes	3	2.00	Other	PU	48
Total			7.00			

Description of deliverables

D9.1 : A Coordination plan will be developed and updated (KNMI 1 pm, SMHI 1 pm) [month 36]

D9.2 : Web portal: Common web page (SMHI 1 pm) [month 6]

D9.3 : Lessons learned: Common lessons learned relevant for the development of the Copernicus Climate Change Service (SMHI 1 pm, KNMI 2 pm) [month 24]

D9.4 : Meeting minutes (SMHI 1 pm, KNMI 1 pm) [month 48]

Schedule of relevant Milestones

Milestone number ⁵⁹	Milestone name	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
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WT4:

List of Milestones

Project Number ¹	607193	Project Acronym ²	UERRA
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List and Schedule of Milestones

Milestone number ⁵⁹	Milestone name	WP number ⁵³	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
MS1	Completion of D1.5 (synoptic obs. quality controlled)	WP1	7	30	Synoptic obs. archived
MS2	Completion of D1.6 (homogeneity tested and adjusted data)	WP1	7	36	Adjusted data archived
MS3	Completion of D1.8 (merged series of synoptical obs.)	WP1	7	42	Merged series archived
MS4	Preliminary EVDA dataset available for preliminary evaluation studies	WP2	4	24	RA data archived
MS5	EVDA ensemble reanalysis raw dataset	WP2	4	42	RA data archived
MS6	HARMONIE reanalysis dataset stream 1	WP2	1	36	RA data archived
MS7	KFENDA Observation dataset	WP2	12	9	RA ensemble data archived
MS8	KFENDA test homogeneous ensemble reanalysis raw test dataset	WP2	12	40	RA ensemble data archived
MS9	Common evaluation procedures (first version) from UERRA-EVAL-PREP for use in WP3 agreed on	WP3	10	6	Preliminary table summarizing common evaluation procedures shared among WP3 partners via email
MS10	First experiences from UERRA-EVAL-EUROPE shared among WP3 partners via email	WP3	10	24	Table summarizing the so far applied common evaluation procedures and sharing of first experiences among WP3 partners via email
MS11	Reanalysis based products included in EEA and JRC reports/websites, in particular Eye On Earth (eyeeonearth.org) and Climate	WP7	3	48	Reports / website contain UERRA RA products

WT4:

List of Milestones

Milestone number ⁵⁹	Milestone name	WP number ⁵³	Lead beneficiary number	Delivery date from Annex I ⁶⁰	Comments
	Adapt (climate-adapt.eea.europa.eu)				

WT5:

Tentative schedule of Project Reviews

Project Number ¹	607193	Project Acronym ²	UERRA
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Tentative schedule of Project Reviews

Review number ⁶⁵	Tentative timing	Planned venue of review	Comments, if any
RV1	12	Brussels	Period1
RV2	21	Brussels	Period2
RV3	30	Brussels	Period2
RV4	39	Brussels	Period3
RV5	48	Brussels	Period3

Project Effort by Beneficiary and Work Package

Project Number ¹	607193	Project Acronym ²	UERRA
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Indicative efforts (Person-months) per Beneficiary per Work Package

Beneficiary number and short-name	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	Total per Beneficiary
1 - SMHI	0.00	82.00	0.00	8.00	8.00	9.00	4.00	0.00	4.00	115.00
2 - MF	0.00	52.00	0.00	14.00	0.00	0.00	0.00	0.00	0.00	66.00
3 - KNMI	12.00	0.00	21.00	20.00	0.00	0.00	5.00	8.00	4.00	70.00
4 - MO	0.00	164.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	166.00
5 - UEA	25.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00
6 - EDI	3.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00
7 - URV	54.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.00
8 - NMA-RO	3.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	7.00
9 - ECMWF	0.00	0.00	0.00	22.00	0.00	0.00	0.00	0.00	0.00	22.00
10 - DWD	0.00	3.00	37.00	0.00	0.00	0.00	4.00	4.00	0.00	48.00
11 - MI	0.00	0.00	9.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00
12 - UB	0.00	47.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.00
Total	97.00	348.00	85.00	64.00	8.00	9.00	13.00	12.00	8.00	644.00

WT7:

Project Effort by Activity type per Beneficiary

Project Number ¹	607193	Project Acronym ²	UERRA
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Indicative efforts per Activity Type per Beneficiary

Activity type	Part. 1 SMHI	Part. 2 MF	Part. 3 KNMI	Part. 4 MO	Part. 5 UEA	Part. 6 EDI	Part. 7 URV	Part. 8 NMA-RO	Part. 9 ECMWF	Part. 10 DWD	Part. 11 MI	Part. 12 UB	Total
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1. RTD/Innovation activities													
WP1	0.00	0.00	12.00	0.00	25.00	3.00	54.00	3.00	0.00	0.00	0.00	0.00	97.00
WP2	82.00	52.00	0.00	164.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	47.00	348.00
WP3	0.00	0.00	21.00	2.00	5.00	7.00	0.00	4.00	0.00	37.00	9.00	0.00	85.00
WP4	8.00	14.00	20.00	0.00	0.00	0.00	0.00	0.00	22.00	0.00	0.00	0.00	64.00
WP6	9.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.00
Total Research	99.00	66.00	53.00	166.00	30.00	10.00	54.00	7.00	22.00	40.00	9.00	47.00	603.00

2. Demonstration activities													
Total Demo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3. Consortium Management activities													
WP5	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
Total Management	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00

4. Other activities													
WP7	4.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	13.00
WP8	0.00	0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00	0.00	12.00
WP9	4.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
Total other	8.00	0.00	17.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	0.00	0.00	33.00

Total	115.00	66.00	70.00	166.00	30.00	10.00	54.00	7.00	22.00	48.00	9.00	47.00	644.00
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WT8:

Project Effort and costs

Project Number ¹	607193	Project Acronym ²	UERRA
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Project efforts and costs

Beneficiary number	Beneficiary short name	Estimated eligible costs (whole duration of the project)						Requested EU contribution (€)
		Effort (PM)	Personnel costs (€)	Subcontracting (€)	Other Direct costs (€)	Indirect costs OR lump sum, flat-rate or scale-of-unit (€)	Total costs	
1	SMHI	115.00	747,500.00	63,000.00	95,000.00	747,500.00	1,653,000.00	1,323,000.00
2	MF	66.00	481,800.00	0.00	21,000.00	100,560.00	603,360.00	452,520.00
3	KNMI	70.00	463,750.00	2,000.00	26,000.00	474,250.00	966,000.00	783,950.00
4	MO	166.00	662,340.00	3,000.00	24,000.00	536,495.00	1,225,835.00	614,417.00
5	UEA	30.00	195,000.00	0.00	9,000.00	122,400.00	326,400.00	244,800.00
6	EDI	10.00	80,000.00	0.00	9,400.00	53,640.00	143,040.00	107,280.00
7	URV	54.00	216,000.00	0.00	12,000.00	136,800.00	364,800.00	273,600.00
8	NMA-RO	7.00	12,600.00	0.00	9,000.00	5,400.00	27,000.00	20,250.00
9	ECMWF	22.00	196,790.00	0.00	9,000.00	123,474.00	329,264.00	246,948.00
10	DWD	48.00	328,080.00	0.00	26,000.00	485,558.00	839,638.00	487,622.00
11	MI	9.00	60,480.00	0.00	9,000.00	68,947.00	138,427.00	103,820.00
12	UB	47.00	272,600.00	0.00	12,000.00	170,760.00	455,360.00	341,520.00
Total		644.00	3,716,940.00	68,000.00	261,400.00	3,025,784.00	7,072,124.00	4,999,727.00

1. Project number

The project number has been assigned by the Commission as the unique identifier for your project. It cannot be changed. The project number **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

2. Project acronym

Use the project acronym as given in the submitted proposal. It cannot be changed unless agreed so during the negotiations. The same acronym **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

53. Work Package number

Work package number: WP1, WP2, WP3, ..., WPn

54. Type of activity

For all FP7 projects each work package must relate to one (and only one) of the following possible types of activity (only if applicable for the chosen funding scheme # must correspond to the GPF Form Ax.v):

- **RTD/INNO** = Research and technological development including scientific coordination - applicable for Collaborative Projects and Networks of Excellence
- **DEM** = Demonstration - applicable for collaborative projects and Research for the Benefit of Specific Groups
- **MGT** = Management of the consortium - applicable for all funding schemes
- **OTHER** = Other specific activities, applicable for all funding schemes
- **COORD** = Coordination activities - applicable only for CAs
- **SUPP** = Support activities - applicable only for SAs

55. Lead beneficiary number

Number of the beneficiary leading the work in this work package.

56. Person-months per work package

The total number of person-months allocated to each work package.

57. Start month

Relative start date for the work in the specific work packages, month 1 marking the start date of the project, and all other start dates being relative to this start date.

58. End month

Relative end date, month 1 marking the start date of the project, and all end dates being relative to this start date.

59. Milestone number

Milestone number: MS1, MS2, ..., MSn

60. Delivery date for Milestone

Month in which the milestone will be achieved. Month 1 marking the start date of the project, and all delivery dates being relative to this start date.

61. Deliverable number

Deliverable numbers in order of delivery dates: D1 - Dn

62. Nature

Please indicate the nature of the deliverable using one of the following codes

R = Report, **P** = Prototype, **D** = Demonstrator, **O** = Other

63. Dissemination level

Please indicate the dissemination level using one of the following codes:

- **PU** = Public
- **PP** = Restricted to other programme participants (including the Commission Services)
- **RE** = Restricted to a group specified by the consortium (including the Commission Services)
- **CO** = Confidential, only for members of the consortium (including the Commission Services)

- **Restreint UE** = Classified with the classification level "Restreint UE" according to Commission Decision 2001/844 and amendments
- **Confidentiel UE** = Classified with the mention of the classification level "Confidentiel UE" according to Commission Decision 2001/844 and amendments
- **Secret UE** = Classified with the mention of the classification level "Secret UE" according to Commission Decision 2001/844 and amendments

64. Delivery date for Deliverable

Month in which the deliverables will be available. Month 1 marking the start date of the project, and all delivery dates being relative to this start date

65. Review number

Review number: RV1, RV2, ..., RVn

66. Tentative timing of reviews

Month after which the review will take place. Month 1 marking the start date of the project, and all delivery dates being relative to this start date.

67. Person-months per Deliverable

The total number of person-month allocated to each deliverable.