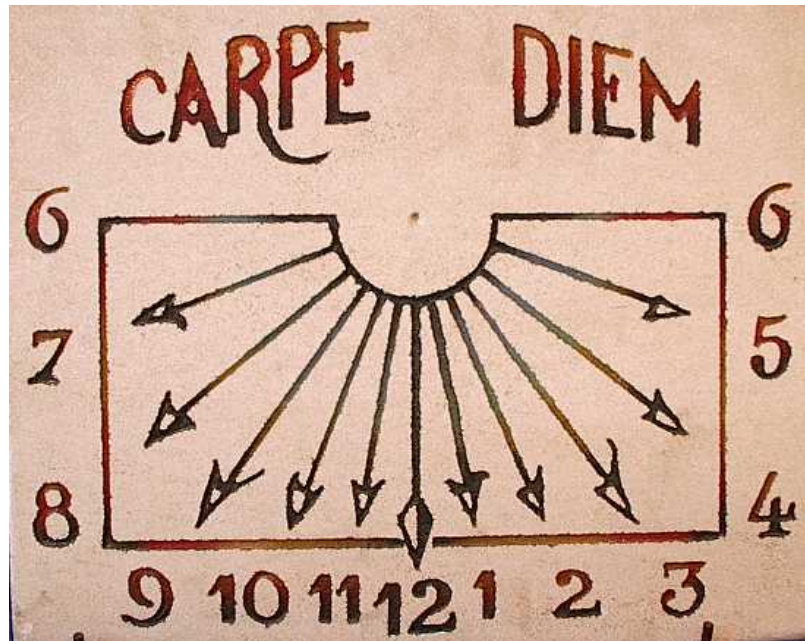


# CARPE DIEM

Critical **A**ssessment of available **R**adar **P**recipitation **E**stimation techniques  
and  
**D**evelopment of **I**nnovative approaches for **E**nvironmental **M**anagement



Contract N° EVG1-CT-2001-00045

6<sup>th</sup> Meeting  
Helsinki – 23-24 June 2004

MINUTES



# AGENDA

## 23 June 2004

18:00 – 19:00	Welcome address <b>WP1 – Project Management – FIRST SESSION</b>	ARPA – SMR FMI All CARPE DIEM partners
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## 24 June 2004

### **AREA 1 – Data assimilation and NWP improvements** *chair by Nils Gustafsson*

09:00 – 09:45	WP 2 EXTRACTION OF INFORMATION FROM DOPPLER WINDS WP 3 DATA ASSIMILATION	SMHI ARPA-SMR UESSEX FMI UBARCELONA
09:45 – 10:30	WP 4 ASSESSMENT OF NWP MODEL UNCERTAINTY INCLUDING MODELS ERRORS WP 5 ASSESSMENT OF IMPROVEMENTS IN NWP	SMHI PROGEA ARPA SMR ISAC-CNR

10:30 – 11:00	Coffee break	
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### **AREA 2 – Improve radar products by using NWP results** *chair by Pier Paolo Alberoni*

11:00 – 11:20	WP 6 ANOMALOUS PROPAGATION	UESSEX UBARCELONA
11:20 – 11:40	WP 8 USE OF POLARIMETRIC RADAR DATA FOR IMPROVING THE RADAR RAIN ESTIMATES	UESSEX DLR
11:40 – 12:00	WP 7 ADVANCED SURFACE RADAR-BASED RAINFALL ESTIMATE	FMI

12:00 – 13:00	Lunch Break	
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### **AREA 3 – Flood forecasting** *chair by Ezio Todini*

13:00 – 14:00	WP 9 ASSESSMENT OF THE BIAS, SPATIAL PATTERN AND TEMPORAL VARIABILITY OF ERRORS IN THE DIFFERENT SOURCES OF AREAL PRECIPITATION ESTIMATES	SMHI PROGEA NUID ISAC-CNR
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14:00 – 15:00	WP 10 OPTIMAL USE OF RADAR, NWP AND RAINGAUGE DATA IN PRECIPITATION FORECASTS FOR IMPROVING FLOOD FORECASTS IN URBAN AND RURAL CATCHMENTS	PROGEA SMHI NUID ARPA-SMR
15:00 – 15:30	WP11 – END-USERS' LEVEL-OF SERVICE REQUIREMENTS	NUID ARPA – SMR SMHI FMI UBARCELONA
15:30 – 16:00	WP 1- Project Management	ARPA – SMR All CARPE DIEM partners
	Closure of the meeting	

## CARPE DIEM – 6<sup>th</sup> Meeting – PARTECIPANT LIST

NAME	SURNAME	INSTITUTION	E-MAIL	PHONE
Pier Paolo	Alberoni	Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna Servizio IdroMeteorologico	<a href="mailto:Palberoni@smr.arpa.emr.it">Palberoni@smr.arpa.emr.it</a>	+39 051 525930
Sandro	Nanni	Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna Servizio IdroMeteorologico	<a href="mailto:snanni@smr.arpa.emr.it">snanni@smr.arpa.emr.it</a>	+39 051 6497552
Andrea	Montani	Agenzia Regionale Prevenzione e Ambiente dell'Emilia Romagna Servizio IdroMeteorologico	<a href="mailto:amontani@smr.arpa.emr.it">amontani@smr.arpa.emr.it</a>	
Ezio	Todini	Progea s.r.l.	<a href="mailto:todini@tin.it">todini@tin.it</a>	+39 051 6389099
Sara	Riccardo	Progea s.r.l.	<a href="mailto:Sara.riccardo@hotmail.com">Sara.riccardo@hotmail.com</a>	
Cinzia	Mazzetti	Università di Bologna	<a href="mailto:mazzetti@geomn.unibo.it">mazzetti@geomn.unibo.it</a>	
Thoams	Börner	DLR	<a href="mailto:Thomas.boerner@dlr.de">Thomas.boerner@dlr.de</a>	+49 8152 282368
Ewan	Archibald	DLR	<a href="mailto:Ewan.archibald@dlr.de">Ewan.archibald@dlr.de</a>	+49 8153 292331
Jonas	Olsson	Swedish Meteorological Hydrological Institute	<a href="mailto:Jonas.olsson@smhi.se">Jonas.olsson@smhi.se</a>	
Åke	Johansson	Swedish Meteorological Hydrological Institute	<a href="mailto:ake.johansson@smhi.se">ake.johansson@smhi.se</a>	
Per	Källberg	Swedish Meteorological Hydrological Institute	<a href="mailto:Per.kallberg@smhi.se">Per.kallberg@smhi.se</a>	
Jarmo	Koistinen	Finnish Meteorological Institute	<a href="mailto:Jarmo.koistinen@fmi.fi">Jarmo.koistinen@fmi.fi</a>	
Heikki	Pohjola	Finnish Meteorological Institute	<a href="mailto:Heikki.pohjola@fmi.fi">Heikki.pohjola@fmi.fi</a>	+358 9 19293626
Kirsti	Salonen	Finnish Meteorological Institute	<a href="mailto:Kirsti.salonen@fmi.fi">Kirsti.salonen@fmi.fi</a>	
Anthony	Holt	University of Essex	<a href="mailto:anthony@essex.ac.uk">anthony@essex.ac.uk</a>	
Stephen	Rae	University of Essex – Dept. ESE	<a href="mailto:Asrae@essex.ac.uk">Asrae@essex.ac.uk</a>	
Yong Kheng	Goh	University of Essex – Dept. of Mathematics	<a href="mailto:Kygoh@essex.ac.uk">Kygoh@essex.ac.uk</a>	
Bernat	Codina	University of Barcelona	<a href="mailto:Bcodina@am.ub.es">Bcodina@am.ub.es</a>	+34 93 4021123
Miquel	Picanyol	University of Barcelona	<a href="mailto:Picanyol@am.ub.es">Picanyol@am.ub.es</a>	+34 93 4034447
Joan	Bech	SMC	<a href="mailto:jbech@meteocat.com">jbech@meteocat.com</a>	
Vincenzo	Levizzani	ISAC – CNR	<a href="mailto:v.levizzani@isac.cnr.it">v.levizzani@isac.cnr.it</a>	+39 051 6398015
Michael	Bruen	Center for Water Resources Research University College Dublin.	<a href="mailto:Michael.bruen@ucd.ie">Michael.bruen@ucd.ie</a>	+353 1 7167378
Benoit	Parmentier	Center for Water Resources Research University College Dublin.	<a href="mailto:Benoit.parmentier@ucd.ie">Benoit.parmentier@ucd.ie</a>	+353 1 7167499
Paolo	Burlando	ETH – Zurich - Swiss		
Marius Victor	Birsan	ETH – Zurich – Swiss		

Presentation shall be made available on the project's web site.

<http://carpediem.ub.es>

The 6<sup>th</sup> project meeting has been held in conjunction with the second project workshop (co-organised with MUSIC and MANTISSA projects). Due to this special event the project coordinator has invited Prof. Paolo Burlando as a member of project TSC, further we have invited Mr. Marius Victor Birsan, from the ETH of Zurich, to present its results on flood forecasting and Ms. Cinzia Mazzetti, Bologna University, to present its work, done within MUSIC, of the Bayesian combination between radar and raingauges.

#### WP 1 – Project Management

##### **Pier Paolo Alberoni, ARPA.SMR, Bologna, Italy**

According with the adopted agenda the following topics have been discussed:

- Financial situation
- Preparation of 30 months report
- HESS Special Issue
- Organisation of final meeting – school

#### 1 –Financial Situation

Due to a late registration of the coordinator's bank account number from the Commission, the funds related to the second project year will be delayed up to august. The situation is actually in progress thanks to the contribution of the project scientific officer. A contract amendment, to register this modification, will be completed soon

#### 2 – Preparation of the 30 months management report

According to the reporting timetable an interim progress report should be prepared within end of August 2004.

The report is composed of one section.

SECTION 1, corresponding to the Management Report, covers the last 6 months of the reporting period.

In order to fill this section each partner shall provide to the coordinators, within the following deadline, the information to fill the financial and man-months tables.

Reporting period :			01/01/04	30/06/04
Partner	Partner name			
Comparison between planned and used resources				
WP	Man Power		Financial Resources	
	U	P	U	P
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

Each area coordinator should provide to the coordinator a short description (1 page) of the objectives, achievements, socio-economic relevance and policy implications and conclusions about their area or responsibility.

A complete draft of the interim report should be ready and disseminate to the partnership, for a final check, within the mid august and the final version shall be delivered to the Scientific Officer within the end of august.

#### 3 – HESS Special Issue

Prof. Todini presents his idea to collect all scientific contributions from CARPE DIEM, MUSIC and MANTISSA in order to prepare a special issue for a scientific journal. This idea was accepted by all the partners. Each partner is committed to provide to Prof. Todini an abstract as soon as possible.

#### *4 – Organisation of the final meeting - school*

Following the decision done in Dublin, at the end of the second year, the project coordinator present a draft idea for the organisation of the final meeting. After discussion it was agreed that the meeting should be run parallel to the planned school. The aim of the school is to provide an advanced training on the multi-disciplinarily components that have to be considered in the hydrogeological risk prevention and management work. The school will be organised over a three year period, and this is a clear result of the project out of its life, in order to cover the different topics related to the hydrogeological risk prevention and management. In each school session a particular aspect will be treated.

Session one – Meteorological aspects – To be held in 2004

Session two – Hydrological and geological aspects – To be held in 2005

Session three – Risk management and prevention – To be held in 2006

Attendance is open to all professional people involved in hydrogeological risk prevention and management. Young scientists, Ph.D students as well post-graduates who still are in their training process are also welcome in order to improve their knowledge of the multi-disciplinarily problems and operational aspects.

The first session of the school is titled: Rainfall estimation and forecast.

This session will focus on the different aspects of precipitation estimation and precipitation forecast.

The relative skill of the different “sources” of rainfall data will be analysed and discussed in order to understand potentials and limits of the measurement tools used and of the techniques described.

Fundamentals of numerical modelling at different time scales, as well as all different aspects that contribute to the rain forecast will be analysed.

An overview of hydrological modelling aspects and their interaction with the rainfall input field will be discussed.

#### *5 – Status of the project*

According with the time-table the project is on its last year and we need to focus our work in the next months on the reporting activity. A general survey of CARPE DIEM shows that the project is well in track, except only part of the work of WP8 that is now in recovering and preparing the deliverables according with the new timetable presented at the end of the second year.

Some workpackages have anticipated the work, one have reshuffle its time-plan and few problems have delayed few workpackages.

### **AREA 1 – Data assimilation and NWP improvements**

**Chair by Per Uden on behalf of Nils Gustafsson – SMHI**

#### WP 2 – Extraction Of Information From Doppler Winds

**Yong Kheng Goh, University of Essex, Colchester, United Kingdom**

Yong Kheng Goh present the update situation of DARWin (Doppler Analysis and Retrieval of Wind Information). This software is now ready to read SMR data (Bologna & Gattatico), convert data from radar grid point to a common cartesian grid place in the Dual-Doppler area, produce graphic visualisation both 2-D (PPI, RHI, VAD) and 3-D (Velocity vectors), retrieve the dual Doppler wind and save the fields in ASCII format.

Some case studies have been presented.

Major outcomes are:

- Analysed a few more new cases.
- All the derived wind fields have been checked by comparing with original measurement and calculating relative deviation of “along-track” component.
- Made initial attempts on triple-Doppler analysis, but need more time to understand Teolo data.

Data from Teolo radar has been provided through the co-ordinator. Few problems are still present in the reading routines.

#### WP 3 – Data Assimilation

**Miquel Picanyol, University of Barcelona, Barcelona Spain**

A presentation of the some results from the comparison between nudging and IUA data assimilation schemes used have been done.

Description of the experiment:

- Corrections on the T, u, v, q and ps variables are introduced via IAU and nudging methods.
- Assimilation frequency: 6 and 3 hours.
- 10 different cases.

Conclusions:

- 3-hour assimilation frequency minimizes the RMSE.
- IAU tends to overestimate the total amount of precipitation while nudging gives a bias closer to zero.
- There are not any significant differences on the forecast precipitation field when assimilating surface pressure.
- Assimilating all meteorological fields or the combination of wind and humidity produces the best impact on the precipitation field.
- The bias is not so affected by the combination chosen.

**Per Unden, SMHI, Norrkoping, Sweden**

Per Unden summarize the results of the intercomparison experiment done, at the moment SMHI and ARPA participate to this activity.

Major results are:

- too large scale of the HIRLAM background errors (developed for 0.4°/ 0.4° grid)
- analysis increments on model levels questionable in steep orography
- dfi initialization not ideally tuned for this resolution and such a small area
- long integration (cdd) without D.A. skilful, but D.A. improves the quality
  
- ARPA and cdc analyses and forecasts generally quite similar
- HIRLAM has stronger (too strong?) 10 metre winds
- HIRLAM warmer night, cooler day in the Alps than ARPA (6 November)
- HIRLAM cooler night and warmer day over Spain than ARPA (6 November)
- 850 hPa analysis differences due to orography and post-processing differences

**Andrea Montani, ARPA-SMR, Bologna, Italy**

Andrea Montani briefly recalls the experiments done with Local model for the intercomparison activity.

**IOP 14**

- The run with data assimilation provides an improvement of precipitation forecast over North-Western Italy (when compared to the control run), although a maximum not observed is also predicted.
- The nudging assimilation scheme has a negligible impact on the forecast of temperature and wind fields

**IOP 15**

- The run with data assimilation has a non-negligible impact on the forecast of precipitation, but does not bring a substantial improvement.
- The use of the nudging assimilation scheme does not have an appreciable impact on the forecast of temperature fields; on the other hand, it allows the generation of different structures in terms of wind forecast.

**Kirsti Salonen, FMI, Helsinki, Finland**

Examples of super-observation done at different resolution have been given. The main part of the work is now concentrated in define the best Super Obs resolution which is compatible with model grid size and with the phenomena to be described.



**Sara Riccardo, PROGEA, Bologna, Italy**

First results on the use of Kalman filtering (KF) and Maximum Likelihood (ML) approach, as suggested by Dee, for Hirlam data assimilation have been presented. The main idea is the estimation of innovation and background error covariance.

The work done cover the following points:

- ✓ Set algorithm ML to estimate covariance parameters
- ✓ Calculation of weight factors for optimal interpolation
- ✓ Application for some types of observations (ex. geopotential and temperature)

**AREA 2 – Improve radar products by using NWP results**

Jarmo Koistinen has been accepted the coordination request to become the Area 2 scientific coordinator.

WP 7 – Advanced surface radar-based rainfall estimate

**Jarmo Koistinen, FMI, Helsinki Finland**

An update of work-package was given. As the first results that need to be raise at the attention of the partnership is that the VPR network correction scheme will be, in the next months, implemented in the NORDRAD network.

Examples of how the melting layer changes its height with time have been given. To solve this problem the scheme use, now, the forecasted height from HIRLAM, while the radiosounding data play a backup role.

WP 8 – Use of polarimetric radar data for improving the radar rain estimates

**Ewan Archibald, DLR, Wessling, Germany**

POLDIRAD has been unavailable throughout course of project due to delays in refurbishment of the radar. It has instead been necessary to use data collected by the S-POL radar during the MAP campaign. Two main disadvantages are:

- Radar operates at S-band. KDP less sensitive to rainfall rate.
- No control over scan strategy. Necessary to use spatial rather than temporal filtering.

Data examined covers IOPs 2, 4, 7, 8 and 14. Examples shown are from IOP 2 which featured the heaviest rainfall, and where the strongest effects likely to be evident. Other cases were predominantly lower intensity stratiform rainfall. In both examples, radar is scanning a sector to the North-West. Terrain is mountainous, hence a relatively high elevation angle being used.

Analysis focussed on a area 64km square. This could represent a model grid or an idealised river catchment.

The deliverable 8.2 is ready and will be made available within one week.

**AREA 3 – Flood forecasting – Todini Ezio, PROGEA**

Prof. Todini introduce area 3 presentation and discussion with a short review of the status of the work done and on the deliverables available up to now.

WP 9 – Assessment of the bias, spatial pattern and temporal variability of errors in the different sources of areal precipitation estimates

WP 10 – Optimal use of radar, nwp and raingauge data in precipitation forecasts for improving flood forecasts in urban and rural catchments

**Jonas Olsson, SMHI, Norrkoping, Sweden**

Jonas Olsson present the status of the activities related to area 3 carried out at SMHI. Activities related to the comparison of precipitation estimates and their performances in runoff modelling are completed.

A number of different sources of area rainfall precipitation have been taking into consideration over the Gimån catchment:

- PTHBV: interpolated gauge data
- HIRLAM: NWP model (+30h - +6h forecasts)
- RADAR: gauge-adjusted radar data
- MA22, MA11: mesoscale analysis, real-time (22) and climate-corrected(11)

In terms of rainfall amounts HIRLAM tend to overestimate spring precipitations while the radar overestimate the autumn season. In term of discharge HIRLAM overestimate the spring response while all others sources give a similar results.

**Åke Johansson, SMHI, Norrköping, Sweden**

Åke Johansson presents results on the comparison between the different methodologies using statistical models MOS, and quantitative precipitation forecasting methods.

**Michael Bruen, NUID, Dublin, Ireland**

A single presentation covering WPs 9 and 10 was given by Michael Bruen. The major steps covered in the period are:

- NWP (HIRLAM) forecasts of precipitation have been acquired from Met Eireann.
- We have begun the task of analyzing this data set and of investigating optimal forecast methods.
- We have two hydrological models calibrated for the data set a distributed model {TOPKAPI (with the help of partner 4)} and a lumped conceptual model {SMARG, (originally proposed by O'Connell & Nash) and implemented by a team (which included Bruen) at UCG } and have some preliminary comparisons.
- Modelling report (lumped & distributed) at drafting stage, some conclusions presented at workshop. Suggest wait for a full year of independent validation data before finalising.

It was agreed that a draft version of the deliverables 10.2 and 10.3 should be made available by NUID within July. The final version, with an update with the last results will be ready for the end of the project.

**Cinzia Mazzetti, University of Bologna, Bologna, Italy**

A presentation on the bayesian combination methodology, developed within the MUSIC project has been given. Scope of the bayesian combinations: Eliminating the BIAS and producing minimum variance precipitation estimates.

WP 11 – End-users' level-of service requirements

**Michael Bruen, NUID, Dublin, Ireland**

A discussion on the outcomes of the workshop, held in Helsinki on 22-23 june, have been done.

Next Meetings

The partners have decided the following meeting timetable

MEETING	PLACE	DATE
7 <sup>th</sup> meeting	Bologna, Italy	Together with the school, 29/11/2004 – 3/12/2004