

# **Convection Workshop**

**IMWM Krakow**

**15 – 16 November 2007**

The first session started at 09:15 h with a tour de table of the participants from four continents and 15 countries. Number of participants was 39.

## **1. Scope of the workshop**

After the first 5 years of MSG operations, a number of applications in the area of severe convective storm detection and nowcasting have been developed by various users. The focus of this workshop was to have a comprehensive inventory of the available applications in this field, with the aim to get deeper insight into the differences and commonalities of the available techniques and products, and their specific area of application.

Future developments, based on the identified existing methods, were discussed, and potential fields of coordination, cooperation, and validation have been identified.

Advantages and deficiencies of existing methods were discussed and areas of improvement to meet the common goal to develop a 'best practice' in the use of the MSG spectral, temporal, and spatial information for severe storm nowcasting in a highly automated and thus objective way were addressed.

The outcome of the workshop is set of recommendations which will allow the participants to move further towards achieving this set of common goals.

The participants were informed that the presentations will be made available on DVD later on together with the workshop report.

## **2. Presentations and Discussions**

The given presentations covered a wide range of topics:

- Detection of pre-convective conditions
- Detection of cloud severity during the cloud formation process
- Use of cloud microphysical retrievals for warning purposes
- Case studies over various geographical areas
- Training aspects of operational satellite products
- Short demonstration of visualisation software (McIDAS-V and HYDRA)

All presentations are available on the conference CD.

Every presentation triggered very lively discussions between the participants, which resulted in a number of recommendations, which are listed in section 4 of this report.

### 3. Future Activities

The final session of the workshop was dedicated to discuss the way forward for the upcoming years. The participants expressed the opinion that the discussion during the two days has been very useful and therefore they were interested to continue with some joint activities.

It was agreed that for future cooperation a Point of Contact (PoC) would be very useful and that it would also be advisable to have a mailing list-server through which information can be shared.

Jarno Schipper (ZAMG) offered to act as the PoC and promised to initiate a list-server with all participants' e-mail addresses. In addition he offered to set up a small Web page through which additional information could easily be located.

The group felt that it would be necessary to identify one or two interesting cases for which all available data (satellite, radar, NWP (global model and local model), in situ data) should be collected, so that all interested parties can run their algorithms on these data sets to validate and compare their results.

Jarno Schipper offered to propose interesting dates, in consultation with the group. Martin Setvak's presentation already identified a few interesting dates which may serve as a starting point. It could also be useful to aim at another case in the future, if not all necessary data were available for the selected case(s) in the past. The data should be collected and placed on an FTP server. This server should finally also host the results produced from these data.

EUMETSAT offered to make this server available for easy access by the members of the group. It was understood that additional interested parties could be given access upon request as well. For optimisation of the data usage and access it was briefly addressed to consider the following topics in future discussions:

- Organisation of the observational data sets for the selected cases
- Access methods (ADDE servers, FTP sites etc.)
- Visualisation and analysis tools (Rosenfeld software, HYDRA, NINJO, McIDAS-V, SUMO)

The benefit of these dataset(s) is seen primarily for scientific cooperation and validation, but also for training purposes. Therefore it was agreed to document the selected case(s) and create a comprehensive set of training material based on them. It was suggested to contact EUMeTrain and ask for their support in these efforts.

As another important outcome of the workshop it was agreed to form a small drafting committee which was tasked to create a 'Best Practices' document which should outline a comprehensive scenario for forecasting and nowcasting severe convective events. This document should consider all available forecasting/nowcasting methods (NWP, air mass analysis, cloud initiation, cloud microphysics, radar). Being comprehensive it was the understanding that the document would emphasise the use of

satellite data (geostationary and polar orbiters). The drafting committee for this best practices document is:

D.Rosenfeld, J. Mecikalski, P. Struzik and J. Schipper

It was also discussed how to continue the cooperation of this group in the future. EUMETSAT informed the participants about the next EUMETSAT conference in Darmstadt, which will be held from 8 to 12 September 2008. During the conference a dedicated session on nowcasting will be conducted which will be co-chaired by Marianne König (EUMETSAT) and Piotr Struzik (IMWM). The participants were invited to submit abstract for that session to report on further progress on their developments.

In the year 2009 the next severe storm conference will be held in Landshut (Germany). The conference is organised by the European Severe Storm Laboratory (Dr. Nikolai Dotzek). It was felt that it would be beneficial to have a EUMETSAT sponsored Convection Workshop either preceding or following that conference, preferably at the same location.

It was recommended to EUMETSAT to get in contact with Dr. N. Dotzek (DLR) to exploit whether a tighter cooperation for convection nowcasting can be achieved. It was recommended that EUMETSAT investigate to become an institutional member of ESSL e.V.

The ESSL Web page is at: <http://www.essl.org/> and the ESWD database is at <http://essl.org/ESWD/> (access to the database is free even to non-members, nevertheless it was considered that EUMETSAT's institutional membership in the ESSL as a nice gesture of support to the ESSL activities).

Finally, the participants were informed that the next European Radar Conference will be held in Helsinki in July 2008.

The workshop was closed at 17.15 h on 16 November.

#### 4. Recommendations

The recommendations resulting from the workshop discussions are grouped into three categories, addressing user needs for new/advanced products, useful tools and training aspects.

##### New/Advanced Products

**Recommendation 01/07:** The generation area of the EUMETSAT MPEF RII which is currently over South Africa should be moved somewhat to the east to better cover South Africa mainland.

**Recommendation 01/07:** The air mass analysis products from Meteosat should be compared with IASI level 2 retrievals. Also the ATOVS soundings should be used for comparison.

**Recommendation 03/07:** The quality of the IASI level 2 data should be demonstrated by comparison to radiosondes

**Recommendation 04/07:** To identify the potential and early detection of severe convection, it is not enough to look at isolated products. The whole set of products for use in the nowcasting process has to be used in a synergetic way. A document describing these best practices should be generated.

**Recommendation 05/07:** There is a need for exploiting the 3.9  $\mu\text{m}$  channel information in relation to lightning initiation.

**Recommendation 06/07:** Virtual Radar images based on satellite data are considered very valuable.

**Recommendation 07/07:** The use of additional instability indices like MU (Most Unstable CAPE), ML (Mixed Layer CAPE) and CIN (Convective Initiation) and/or a definition of other new indices should be considered.

**Recommendation 08/07:** The use of a mesoscale divergence products may give additional insight in severity of rainfall and convection processes, so the generation of this product is encouraged.

**Recommendation 09/07:** Fields of vorticity and other NWP outputs should be used in combination with satellite and radar data.

**Recommendation 10/07:** The combinations of NWP output and satellite products like GII in a composite visualisation are considered very useful.

**Recommendation 11/07:** It was suggested to EUMETSAT to investigate whether a single cloud free pixel can be considered representative for the whole 15 x 15 pixel area of the global GII. Generally the GII should be produced run with higher resolution, if possible.

**Recommendation 12/07:** The CI product using MSG SEVIRI data is considered very promising and it was recommended to work further on MSG specific improvements (more CI test criteria).

**Recommendation 13/07:** The need for data (radar and lightning) for validation of advanced products exists and cooperation between involved parties should be stimulated.

**Recommendation 14/07:** Climatologies of severe storms and derived severe convection indices derived from satellite data would be of interest and it should be investigated who could produce them.

**Recommendation 15/07:** EUMETSAT should apply for an institutional membership in the European Severe Storm Laboratory (WW.ESSL.ORG) and contact N. Dotzek (DLR) for requesting to get access to the European severe storm database.

**Recommendation 16/07:** For case studies it is strongly recommended to store the original volume radar data to allow for later reprocessing.

**Recommendation 17/07:** Information of low level moisture for identification of onset of convection should be provided.

For future geostationary systems (e.g. MTG and GOES-R) hyperspectral sounding for tracking of retrieval information is very important to get a better handle on severe weather development.

**Recommendation 18/07:** For determination of detailed cloud structures, the data from A-Train should be analysed.

**Recommendation 19/07:** In addition it was felt that for optimisation of the global space based observation system the afternoon polar orbits should be more populated.

**Recommendation 20/07:** Rigorous independent verification of the NWC products is important. Comparison with sounding data is considered important.

**Recommendation 21/07:** Added benefits of the rapid scanning service for nowcasting should be evaluated.

**Recommendation 22/07:** User requirements should be addressed through the operational needs (to predict certain phenomena) – too detailed requirements on design and architecture should be avoided.

## **Tools**

**Recommendation 23/07:** EUMETSAT to seek support for the implementation of the “Rosenfeld software tools” for operational use.

**Recommendation 24/07:** For interpretation of the IR channels one should use standard colour tables for easier cooperation and couple the scheme to the tropopause temperature.

**Recommendation 25/07:** Data formats for data exchange are important. Use of other formats than the currently used WMO formats should be investigated (e.g. HDF5, NetCDF4). However, it should be avoided to invent additional formats.

**Recommendation:** EUMETSAT to make standard parallax correction tables per km height for standard satellite positions available via the Web.

**Recommendation 26/07:** A mailing list for use by the workshop participants should be set up.

**Recommendation 27/07:** EUMETSAT to consider putting at a high level a link to the training and tools section of its Web site.

### **Training Aspects**

**Recommendation 28/07:** Topical training sessions are considered to be beneficial. Training on new products is essential.

**Recommendation 29/07:** Some products should be described in form of nice examples for use at lectures in courses and at universities. Training material is often difficult to find. It was necessary to distinguish education and training.

**Recommendation 30/07:** Developers of products should document their products and publish in refereed literature their methods and results.

**Recommendation 31/07:** Training and related material should be provided in a process oriented way.

**EUMETSAT-IMWM  
“Convective Workshop”  
15-18 November 2007  
Krakow, Poland**

Program

**14 November (Wednesday)**

Arrival of Participants

**15 November (Thursday)**

**09:00 - 9:15 Registration**

**9:15 - 9:30**

- Welcome speech (IMWM)
- Purpose of the Workshop (Volker Gärtner, Marianne König)
- Logistic information (Piotr Struzik)

**9:30 Session I - Chairman Volker Gärtner**

9:30 M. König and S. Joro “The MSG Instability Product”

9:50 J. Mecikalski “Use of geostationary satellite information to predict thunderstorm initiation, rainfall intensity and lightning over the 1-hour timeframe”

10:10: Group discussion

*10:40-11:10 Coffee break*

11:10 E. de Coning “The use of MSG, radar and lightning on a regional basis as nowcasting tools”

11:30 J. Schipper “Case Study - comparison on the nowcasting of convection using SAI (NWCSAF), GII and several products from INCA”

11:50 P. Struzik “Experiences with use of satellite derived air stability indices as storm predictors”

12:10 M. Pajek “Use of satellite derived air stability indices - case studies”

12:30 Group discussion

*13:00- 14:00 Lunch break*

14:00 Sz. Malinowski „Convection modelling”

14:20 K. Bedka “An End-to-End Convection Diagnostic and Nowcasting System for MSG SEVIRI and GOES-R Risk Reduction”

14:40 R. Becker "Prediction and Monitoring of Convection using MSG data"

15:00 T. Böhm “Capability of Satellite Data for Forecasting and Monitoring Convection”

15:20 J. Schipper “Inca nowcasting system”

15:40 Group discussion

*16:00 - 16:30 Coffee break*

17:00 Preparation of recommendations, actions, possible common future activities (Session II)

17:15 Final remarks and conclusions, plans for future

19:30 Workshop Dinner sponsored by EUMETSAT and IMWM

## **17 November (Saturday)**

*Social event sponsored by IMWM*

08:45 Bus to Wieliczka Salt Mine leaving hotel Cracovia

09:45 Visit to Wieliczka Salt Mine (see [www.kopalnia.pl](http://www.kopalnia.pl) - English version available)

11:45 Lunch underground

13:00 Bus from Wieliczka to hotel Cracovia

14:00 End of Social Event



## Appendix II

## Participants



No	Country	Name	Institution, Address	e-mail
1.	Austria	Jarno Schipper	ZAMG, Austria	jarno.schipper@zamg.ac.at
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