

# **Convection Working Group Meeting**

*Landshut, Germany*

*8-10 October 2009*

*Participants:*

Volker Gärtner (**Chair**)

Nikolai Dotzek (**Chair**)

Jarno Schipper (**Secretary**)

Christo Georgiev

Natasa Strelec

Martin Setvak

Jindrich Stastka

Michaela Radova

Patrick Santurette

Yann Guillou

Caroline Forster

Dennis Stich

Marianne König

Christoph Zingerle

Regina Hoefenmayer

Humberto Barbosa

Jochen Kerkmann

Sauli Joro

Oliver Sievers

Bernhard Reinhardt

Maria Putsay

Ralph Petersen

Daniel Rosenfeld

Davide Melfi

Agostino Manzato

Monika Pajek

Piotr Struzik

Sorin Burcea

Adrian Antonescu

Jan Kanak

Mateja Irsic Zibert

Estelle de Coning

Ramon Vazquez

Cecilia Marcos

Miguel Martinez

Pilar Fernandez

José Miguel Fernández-Serdán

Luca Nisi

Aydin Ertürk

John Mecikalski

Chris Siewert

Kris Bedka

Paolo Antonelli

- Volker Gärtner (EUMETSAT) and Nikolai Dotzek (DLR), chairs to the CWG, opened the meeting and welcomed everyone to Landshut.
- The list of actions and recommendations from the last CWG meeting (Krakow, 2007) were presented by Marianne König (EUMETSAT). Further discussion took place on some of the recommendations which are listed below.
- The MSG rapid scan service (RSS) has been operational since summer 2008. **It is desired to also continue this service in the future at least until end of 2013.** Maria Putsay has gained much experience in the use of RSS which she demonstrated in this presentation (<http://www.satreponline.org/event/conweek.php>). Also Martin Setvak demonstrated cases with RSS and finally Jochen Kerkmann pointed to the fact that there are several cases existing with MSG RSS in the Image of the month library.
- Point has to be made that European NMSs are cancelling radiosondes for cost saving reasons. Validation will become a problem since the only data that will be left for validation will be model data which already contain satellite data. A recommendation is that moisture and temp profiles from Aircrafts should be made available. This is a recommendation that could go to AMDAR. (*WMO-No 958*).
- Information on the colour enhancement for IR10.8 introduced by Martin Setvak is available at the website at: <http://www.satreponline.org/tooltip/enhanced.html>. This information was passed to Kris Bedka and the group of MCIDAS-V developers to consider inclusion in their product.
- The links with the tables to the parallax corrections is available over the CWG website. The link with explanation can be found in the respective document under the section "Documentation". The NWCSAF package also provides tables for parallax correction.
- EUMETSAT uses reports of ESSL database for validating the CI product in the framework of a study.
- Recommendation is to get in contact with Opera in retrieving radar data for research purposes. The PPI images from Opera are now only available every half hour. The data will in future be stored in HDF5 format and will only be accessible/available to Opera members for research purposes.
- Storing original volume common satellite, lightning, radar data to enable reprocessing and research is highly recommended!
- John Mecikalski is very much interested in radar data for validation of CI, which would really help. Turkey and Rumania have positively reacted to this request to collaborate and share radar data. All other institutes should also look at the possibility to share archived RADAR data for the purpose of CI Validation!
- Recommendation to NWCSAF is to use the A-Train satellites (e.g. Calipso) for validation of cloud phase (NWCSAF ) as opposed to LIDAR from surface. Contact Kris Bedka, Marianne, NASA
- Sauli Joro (EUMETSAT) gave a brief presentation informing the group on the new hardware that will become available at EUMETSAT in 2010. Recommendation of the group is that EUMETSAT

makes the global Full Earth Scan GII product available on a 3 x 3 pixel resolution for dissemination via EumetCast. The Rapid Scanning Service GII product should be, if possible, provided in a 1 x 1 pixel resolution. In this case the current RII product is considered to be obsolete.

- Estelle de Coning (SAWS) presented the further research of GII in which she combines several instability indices and sets thresholds to produce a Combined Instability Index (CII). The forecasters in South Africa have stressed the benefits of this and CII needs to be considered for different regions of the world. Estelle also showed that there is a difference between the satellite derived instability information and model forecasts (added value, not contained in the model data). The research compared RII early in the morning with lightning occurrences later in the day
- With respect to the presentation of Estelle; Ralph Petersen pointed out that it could help to use sigma coordinates for calculating instability Indices to overcome the problem of orography from the level of 850 hPa. (i.e. not possible to calculate K-index or lifted index from high surface)
- Piotr Struzik (IMGW) shared his experience on the use of GII making the remark that GII gives better humidity information than temperature. In this research the measurements of airplanes were compared to GII. Piotr also informed the CWG that an expert system is being developed in Poland that gives the forecaster a hint where convection is expected based on different indices.
- Miguel Martinez (AEMET) showed the first results of PGE13, the new product of the NWCSAF. This new product is a physical retrieval with the aim to also derive instability information.
- Ralph Petersen presented the GOES DPI NearCast system. He pointed out that SEVIRI is not capable of producing a CAPE product type (not enough temperature information in the channels). The satellite provides horizontal distribution of the moisture with much better resolution than the model. Isolated convection cases are the ones where satellite data gives much improvement compared to the model. Models often miss the exact location although they correctly identify the conditions in the general environment.
- Patrick Santurette (Meteo France) presented destabilization by upper-level PV advection, which shows the importance of moisture convergence (low level wind field). It can, however, not demonstrate the intensity of the associated convection, but it is an important precondition to set the synoptic environment of instability that can be seen with satellite.
- Christo Georgiev presented the diagnosis of the convective environment by using WV imagery. The MPEF DIV product is used as a diagnostic tool and helps to find areas favourable for development of severe convection.
- Marianne König (EUMESAT) presented the results of a new GII retrieval. In the research she is using IASI instead of NWP as a first guess for the retrieval of the GII product. IASI L2 product does not look good (especially in the low layers) resulting in poor results for GII retrieval, which could be a result of a number of problems (not sufficiently high number of IASI channels used, improper declouding etc.) Paolo Antonelli also stressed to the research by Marianne that low level WV IASI profile is a big difficulty in products from hyper-spectral sounders (because of surface emissivity).

- The EUMETSAT sponsored training project EUMeTrain will try to find a case with a wrong PV anomaly diagnosis (ECMWF vs. satellite!) and to show the benefit of the conceptual model that was developed by Georgiev and Santurette for showing the benefit of the satellite.
- Discussion among the group on new researches and publications brought to light that in the interest of the group it would be good if secretary of CWG were informed about new publications, which should be put as an abstract on the website, if possible. The secretary will then inform the community. References of articles should also be put on the website!
- Local installations of GII now exist in France, UK, Poland, Slovakia, South Africa etc. ZAMG (Christoph Zingerle) as well has shown interest. A mailing list will be comprised to share the experiences on this installation and to share the experiences of the forecaster! Case studies should be forwarded to secretary to combine training towards forecasters.
- Smaller mailing list should also be made for convective initiation and mature phase. The persons in this list need to inform each other on their researches and their work. Abstract of these discussions should on regular interval be passed on to secretary and being put on website
- NWCSAF has now a topical image gallery with best practice examples to illustrate the updates on all the products. Everyone is invited to send these examples to Pilar Fernandez (with short description of the images if possible).
- NWCSAF is also interested in receiving further input for next phases (comments or proposals on new products or product improvement), linked to incoming SAFNWC activities.
- J.M Fernández from *Analysis and Forecasting Techniques* Team in AEMET, gave a presentation on forecasting training on convection, and improvements of satellite data display on convective aspects, for forecasters in his Agency.
- Daniel Rosenfeld (Hebrew University of Jerusalem) gave a presentation on the method of T-reff (Temperature and effective radius of the cloud particles. The most important aspects coming from this presentation are:

#### *A. Relations between statistical and physical approaches to Convective initiation*

Moving from empirical statistical search to more physically based methods is necessary to make a significant advancement with respect to what has been achieved until now.

This is necessary for identifying the precipitation potential of convective clouds, their rate of vertical growth, and for their propensity to become severe. It is also the basis for assessing their aviation hazards, and stated in B.

#### *B. Aviation safety*

Clouds with strong updrafts and/or super-cooled water content that do not contain large hydrometeors represent aviation hazard, because they do not appear on the radar screen of the airplanes.

This can happen in two scenarios:

1. Highly continental clouds with strong updrafts do not produce radar echoes up to the height of the -30C isotherm or even colder, more so with more vigorous clouds. These clouds contain very strong turbulence that can be dangerous to passenger airplanes. Satellite observations can identify them by using the T-Re relations, and alert on the environment that contains them.
2. Highly maritime deep clouds with extensive rainout can develop with accelerating updrafts above the freezing level with little precipitation and radar echoes, again representing unseen strong updrafts (although not as much as the continental clouds) that endanger airplanes. These clouds can also be identified by satellite analyses of T-Re and expansion rates of anvils.

- Caroline Forster (DLR) showed a small demonstration of the FLYSAFE project and what impact it could have had on the Air France plane crash in early June 2009 of the Atlantic Ocean.

- A key case to show the best examples of the work of CWG is being recommended. The case happened on 25<sup>th</sup> May and affected most of Western and Central Europe. It was the first major TSRA of the year. Recommendation to all is to combine forces and retrieve and calculate material for this case to show the benefit of “our” tools for the pre convective environment, the convective initiation, and mature convective state. This material can be published at:

[http://convection.satreponline.org/dokuwiki/doku.php?id=25\\_may\\_2009\\_-\\_first\\_severe\\_convection\\_in\\_europe\\_of\\_the\\_season\\_-\\_the\\_showcase](http://convection.satreponline.org/dokuwiki/doku.php?id=25_may_2009_-_first_severe_convection_in_europe_of_the_season_-_the_showcase)

- Satellite, radar and all other data should for this case be made available to all on FTP server.

- There was the wish from CWG to make the T-Reff plot block operational in Europe. To start with the recommendation it would be appreciated if we can get for the 25<sup>th</sup> May the 26 x 26 pixel T reff plots to show and describe the potential more for MSG FOV.

- Recommendation to take the working diagram of Kris Bedka (first slide in his powerpoint presentation) and identify at what fields research by CWG is now being done. Diagram will be made available on the website.

- Martin Setvak made the recommendation to NWCSAF to use pattern-recognition for the detection of ring and U-shaped storm to correctly determine the CTH to these storms. This recommendation will taken up for future development (CDOP-2).

- Martin Setvak identified that more attention should be aimed at overshooting tops using more data sources (hence, not only satellite but radar as well!). One needs to be aware that the 5 minute RSS may not be sufficient.

- There is the recommendation to use the Sandwich technique which can be applied to combining HRV with Enhanced IR10.8 images. More information to this is found at:

[http://convection.satreponline.org/dokuwiki/doku.php?id=sandwich\\_product](http://convection.satreponline.org/dokuwiki/doku.php?id=sandwich_product)

- Jan Kanak presented the unconventional visualization tool for MSG satellite images that he developed at his institute and stressing the benefits for operational use.

- Jan Kanak will contact Jarno Schipper to create a list with links and description of similar visualization software as Jan has developed. Other tools already identified are SUMO (SAWS), the tool from Aydin Erturk.
- Daniel Rosenfeld pointed that this visualization software should be freely available for science community. Commercial usage should pay a license.
- CWG brought to light the discussion on when a storm is considered severe. By definition, a severe thunderstorm is a thunderstorm that contains any one or more of the following three weather conditions:
  - Hail that is 3/4 of an inch or greater in diameter
  - Winds 58 miles per hour or greater
  - Tornadoes
- Davide Melfi presented the results of the NEFODINA project. Data of the past three days are always available on the FTP site of METEOAM. The link to this FTP will be forwarded by e-mail to all CWG members.
- The NEFODINA overlays will also be made available as an overlay on Satrep Online.
- In the same light also Caroline Forster has expressed her contribution with Yann Guillou to share the XML version of RDT to Satrep Online to acts as an overlay.
- Cecilia Marcos (NWCSAF) gave a brief presentation on the new updates of the CRR products. Kris Bedka suggested looking at Vertical Integrated Liquid Water when comparing CRR with cloud to ground lightning and not at only radar data. Results are expected to be better.
- On the final day of the CWG meeting Jarno Schipper presented the CWG website in which he illustrated the benefit of using a WIKI to submit case studies and documents to the CWG website. This has the benefit that the user community can control what is being published and it can enhance the discussion on the material published. Registration of such a WIKI is necessary to avoid abuse.
- The showcase on the CWG website should be updated more regular. If you have a nice case please make a WIKI and Jarno will make some extra advertisement to it on the main page
- The documentation page has been categorized and is in the form of a WIKI so that each can contribute.
- The Satrep Online was presented by Jarno Schipper. This is NOT a nowcasting tool, but is a platform to advertise and train products (also from CWG) to the community! Plans are to start a South African Satrep Online soon.