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European Severe Storms Laboratory

Newsletter 2013-1

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First ESSL Testbed in June 2012

From 4 June to 6 July 2012, the first ESSL Testbed took place at ESSL's newly-opened Research and Training Centre in Wiener Neustadt, Austria.

At the Testbed, 67 participants from 21 countries, including both researchers and forecasters, worked closely together on putting new forecast supporting products and methods to the test. The main activities were to prepare experimental forecasts for severe weather for day 1, 2, 3, 4 and 5 as well as "nowcasts" for the following 2 hours using the available Testbed tools and standard meteorological data. Subsequently, a verification of these forecasts was performed using the European Severe Weather Database, followed by an evaluation of forecasting tools and techniques.

Given the various backgrounds of the participants, an important goal of the Testbed is to acquaint its participants with severe weather forecasting methods and techniques that work universally.

Testbed participants preparing a forecast

Among the tools that were evaluated were visualizations of high-resolution ensemble NWP (COSMO-DE-EPS), the satellite-based cloud top cooling and overshooting top detections, lightning detection (GLD360, EUCLID), ECMWF's Extreme Forecast Index, cell-tracking algorithms (Cb-TRAM and Rad-TRAM), an automated nowcast system (NowcastMIX). The participants also worked with several global and regional NWP models (GFS, ECWMF IFS, ALARO5, COSMO-EU) and various satellite products (e.g. the sandwich product).

In 25 "Expert Lectures", broadcast online to remote participants, researchers provided background information on their products and internationally renowned experts in forecasting presented their viewpoints on storm forecasting and its scientific roots.

The 2012 Testbed was organized in close collaboration with the Austrian Central Institute for Meteorology and Geodynamics (ZAMG) and supported by EUMETSAT, DWD, WMO Region VI, VAISALA, the German Aerospace Center DLR, the City of Wiener Neustadt, the state of Lower Austria, EUMETCAL, EUCLID, CHMI, Austro Control, and NOAA's GOES-R programme.

The registration for the 2013 Testbed, to be organized from 1 - 26 July, has opened at http://essl.org/testbed.

Grand Opening of the ESSL Research and Training Centre

On 21 June 2012, the ESSL Research and Training Centre celebrated its Grand Opening in Wiener Neustadt, Austria.

The opening ceremony was led by the ESSL Director of Operations, Alois M. Holzer. He welcomed the guests with an introduction to the ESSL. In the course of the evening, several speakers stressed the need of an international focus on severe weather and climate change.

The audience was addressed by Dr. Michael Staudinger (Director of ZAMG and ESSL Advisory Councillor), Dr. Dimitar Ivanov (Chief of the World Meteorological Organisation (WMO) Regional Office for Europe, representing WMO Region VI President Ivan Cacic), Dr. Fritz Neuwirth (President of the Austrian Meteorological Society and representing the president of the European Meteorological Society, Dominique Marbouty), Bernhard Müller (Mayor of the city of Wiener Neustadt) and Klaus Schneeberger (Chairman of Club in the provincial parliament of Lower Austria and representing the Governor of Lower Austria, Dr. Erwin Pröll).

ESSL Director Dr. Pieter Groenemeijer formally opened the Research and Training Centre at the end of the official ceremony. The Centre is the venue for several workshops, seminars and, of course, the ESSL Testbed.

Upcoming ECSS2013 in Helsinki, 3-7 June 2013

The preparations for the upcoming 7th European Conference on Severe Storms in Helsinki are being carried out at full speed. The conference is jointly organized by ESSL and the Finnish Meteorological Institute. The Scientific Programme Committee is chaired by Dr. Harold Brooks from the National Severe Storms Laboratory.

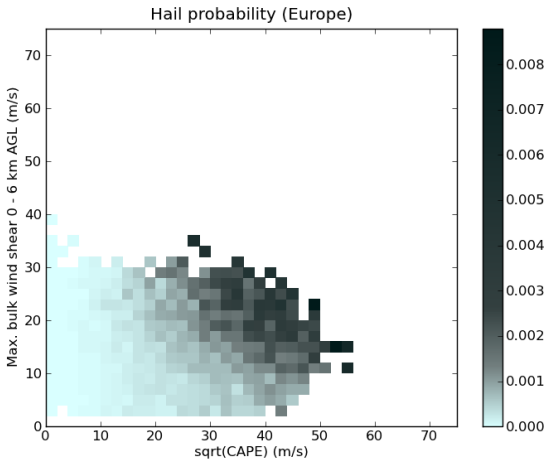
We are looking forward to a very interesting conference to be held at the Marina Congress Center situated at the heart of Helsinki.

The ECSS will feature sessions on flash floods, tornado dynamics, radar, satellite, and lightning among several other topics. Keynote talks will be given by renowned scientists from these very diverse fields: Robert-Davies Jones, Peter Höppe, Yvette Richardson, Angelika Werner, Colin Price, Charles Doswell III, V. Chandrasekar and Louis Wicker. A preliminary conference programme is available on the ECSS website at www.essl.org/ECSS. On this website, one can register for the conference, too.

STEPCLIM: Severe Thunderstorm Evaluation and Predictability in CLImate Models

While thunderstorms are increasingly recognized as an important hazard to life and property in Europe, still relatively little is known about the effects of climate change on the frequency and intensity of these localized and short-lived hazards. The European Severe Storms Laboratory (ESSL) addresses this issue in the project STEPCLIM ("Severe Thunderstorm Evaluation and Predictability in Climate Models"). The main objective is to provide a suite of physical metrics to assess the frequency and intensity of severe thunderstorm hazards from climate model data. These metrics are developed using reanalysis data and hindcasts of a developmental decadal climate modelling system MiKlip, and quality-controlled severe storm reports from the European Severe Weather Database (ESWD).

In order to characterize the local state of the atmosphere, a set of parameters will be defined which have a physical meaning in the dynamics of convective storms. These include instability, vertical wind shear, and measures for lifting support or possible trigger mechanisms, as well as other quantities which describe the vertical profiles of temperature, moisture and wind.



Probability of hail in Europe as function of two parameters: 0-6 km bulk wind shear and the square root of CAPE

A first raw version of these metrics is developed by comparing ECMWF (ERA-Interim) reanalyses with ESWD storm reports in order to distinguish between situations with and without an occurrence of local severe weather phenomena. Subsequently, the set of metrics is refined by the use of regionalized reanalyses and hindcasts of the MiKlip climate model.

The method extends earlier work conducted in the United States thereby re-calibrating the parameter space developed therein with respect to the European thunderstorm and severe weather climate. It is shown that severe weather in Europe

frequently occurs in environments that can be considered relatively benign compared to North American standards. This can be attributed to geographic differences, like the different distributions of land and sea, of flatlands and mountains, and their effects on the availability of the ingredients for deep moist convection and severe weather.

Further novel aspects of the present study comprise a stratification of the developed metrics with respect to different types of severe weather (tornadoes, severe wind gusts, hail, and excessive precipitation), the development of a proxy for convective initiation, the investigation of the influence of different resolutions of the underlying climate model, and the application of the developed metrics on future regionalized climate projections.

Convection Working Group (CWG) secretariat

The Convection Working Group, consisting of scientists from more than 40 countries, has the aim to make a full inventory and evaluation of the existing convection nowcasting products that have been (and are being) developed in the Meteosat Second Generation era. In order to arrive at a “Best Practices” guideline for future use the Working Group meets regularly to exchange results and to broaden the scientific expertise.

In 2012, ESSL’s Austrian subsidiary European Severe Storms Laboratory - Science and Training has taken on a number of activities in support of the CWG. Most visible is perhaps developing and maintaining its newly designed website: http://www.essl.org/cwg (see Figure). This web site serves as a tool to support the exchange of knowledge as an interface to the broader scientific community.

Points of Contact to the CWG are Marianne Koenig (EUMETSAT), Martin Setvak (CHMI, Czech Republic), Pieter Groenemeijer (ESSL), John Mecikalski (University of Huntsville, USA), Kris Bedka (Science Systems & Applications, Inc. @ NASA Langley Research Center, USA) and Volker Gärtner (EUMETSAT).

Aurora Bell leaves the Executive Board

The Executive Board (EB) regrets that Dr. Aurora Bell has decided to leave the EB of ESSL effective with the beginning of the year 2013 upon resigning as a Deputy Director. Instead of a role inside the EB, Aurora will now be an Assessor to the Board and stay within reach with her valuable experience.

ESSL General Assembly 2012

On 6 September 2012, the annual ESSL General Assembly took place as a side meeting of the EUMETSAT conference in Sopot, Poland, passing new Articles of Association with a now flexible number of Deputy Directors.

After the reports of the members of the executive board, the acceptance of the last Annual Accounts and Annual Report, and the exoneration of the executive board the General Assembly voted on the new ESSL Articles of Association. The proposed changes were accepted unanimously. Aside from a few formal requirements by the Registry Court they mainly introduce a flexible to the number of Deputy Directors, between 1 and 3 to be determined at the General Assembly.

Based on the new ESSL Articles of Association, the Executive Board had to be elected anew. The respective candidates for the Executive Board were elected: Pieter Groenemeijer as Director, Kathrin Riemann-Campe as Deputy Director and Alois M. Holzer as Treasurer.

Dr. Pertti Nurmi

At the General Assembly votes were cast for three candidates for the Advisory Council, as the terms of office of three Advisory Council members ended at the end of 2012: David Schultz, Vincenzo Levizzani and Daniel Rosenfeld. David Schultz and Vincenzo Levizzani were re-elected for a second term. The EB regrets that Daniel Rosenfeld has left the council.

The open position was filled by Pertti Nurmi, Head of Meteorological Applications at the Finnish Meteorological Institute, whom the Executive Board would like to welcome wholehartedly.

The next General Assembly is planned on Tuesday 4 June as a closed side-event of the 7th European Conference on Severe Storms at the Marina Congress Center in Helsinki. A formal invitation will be sent out early May.

ESWD Overview 2012

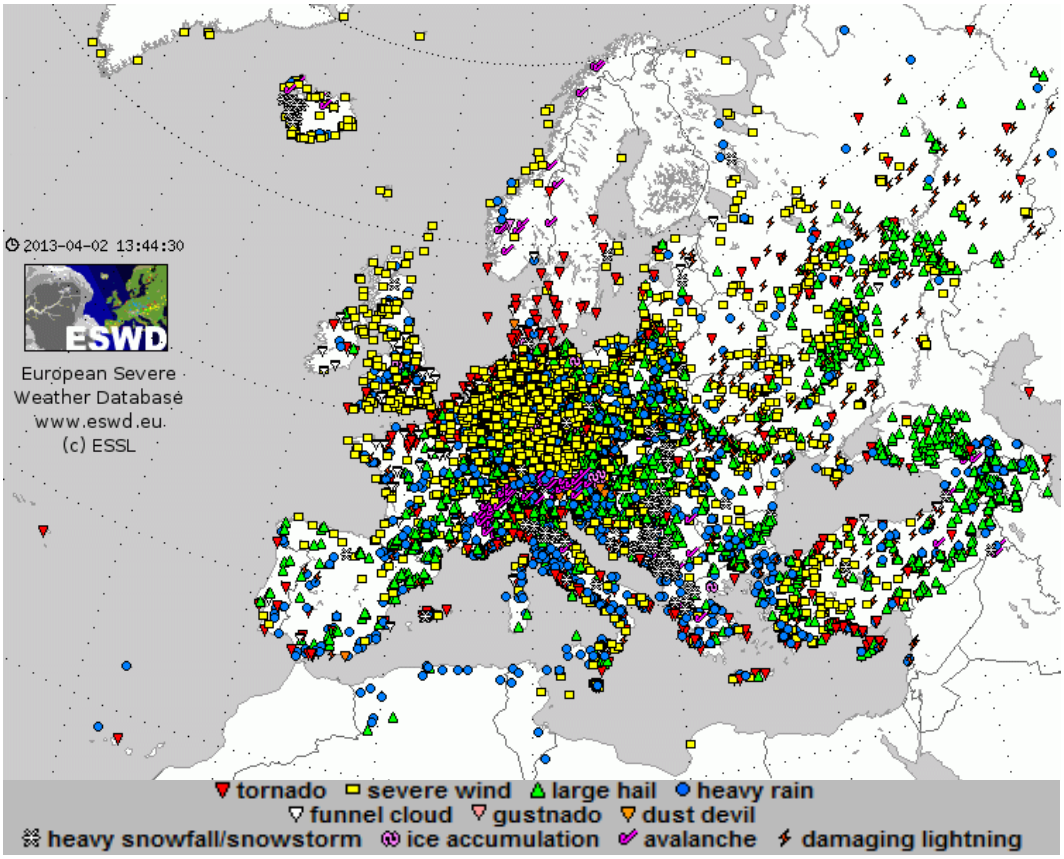
For the year 2012, a total number of 8967 severe weather events were reported, which is a new record high of reports per year.

Moreover, the absolute number of reports exceeded 50000 last September. In addition to the large spatial coverage, the reports cover almost two millennia in time. The earliest report documents a severe wind event in todays' United Kingdom at the North Sea coast in June in the year 15.

Over 95 % of the 2012 related reports passed the first quality control level QC0+.

Number of reports 2012	Quality control applied to report
421	QC0, as received
1262	QC0+, plausibility checked
7144	QC1, report confirmed by reliable sources
140	QC2, event fully verified

The number of ESWD reports for the year 2012 per quality control category.



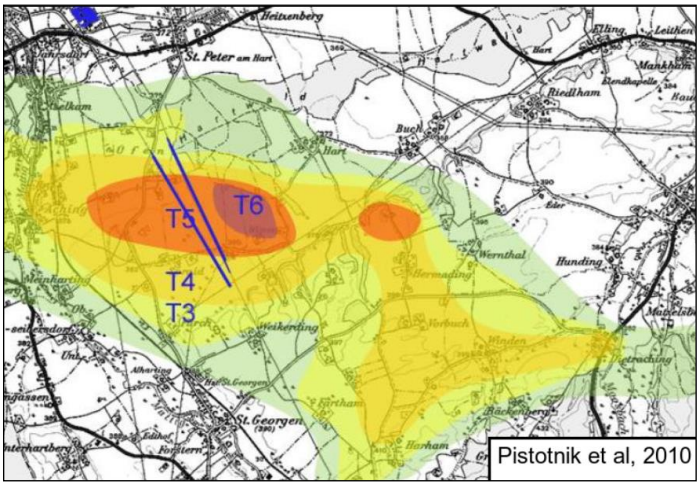
All ESWD reports from 1 January to 31 December 2012. Symbols of severe weather events overlap each other in some areas.

Upcoming Training Activities and Workshops at the ESSL Research and Training Centre in Wiener Neustadt

Out of the full programme available on our ESSL website http://essl.org we would like to highlight two activities:

Dr. Johannes Dahl (Convective Storms Group, North Carolina State University, and ESTOFEX) will present his seminar "**Forecasting Severe Convection II (Advanced Course)**" from 27 to 29 May 2013. We decided to offer a second module in addition to our basic course by Dr. Chuck Doswell, which will again be offered in September.

This September (from 2 to 6) we also address a special target group in a workshop called "**Tornado and Windstorm Damage Assessment**". Knowledge in the field of indirect wind speed estimation still is basic in most of Europe, although severe downbursts and tornadoes often cause large damage or even losses of life. Target groups therefore are climatologists of weather services dealing with severe weather reports, specialists of the insurance sector, scientific working groups and interested individuals.



Damage rating map of a downburst during storm Emma, 1 March 2008.

Topics of the workshop:
- Importance of damage assessment for severe storm climatology
  (with emphasis on the ESWD)
- Methods of damage survey and application of wind damage scales
- Selected case studies and/or a current field study, if a recent case is within reach
- Expert discussion on damage assessment methods and their future development

The workshop will be led by a group of ESSL staff and invited external experts. If you are interested in these activities we ask you to register as soon as possible on the ESSL website (www.essl.org).

Wessling, 3 April 2013

Pieter Groenemeijer, Director
Alois M. Holzer, Treasurer
Kathrin Riemann-Campe, Deputy Director