ANNUAL REPORT 2011

European Severe Storms Laboratory e. V.

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Contents

The European Severe Storms Laboratory - ESSL

Each year, severe thunderstorms inflict an estimated total damage of about 5 billion Euro and lead to many fatalities. ESSL's mission is to make Europe more resilient to severe weather. It does so by

- Performing fundamental and applied research on severe convective storms in Europe;
- Operating the European Severe Weather Database, ESWD;
- Organizing the European Conferences on Severe Storms, ECSS.

The European Severe Storms Laboratory e. V. was founded as a private, non-profit research organisation in December 2006. It is a spin-off of German Aerospace Center DLR in Oberpfaffenhofen, and relies on the long-term expertise of its international team. Presently, the ESSL office is located at the DLR-*Institute for Atmospheric Physics*

The following people have contributed to this report:

Pieter Groenemeijer
Alois M. Holzer
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Kathrin Riemann-Campe

1 Introduction

In 2011, the European Severe Storms Laboratory was full of activity in all respects. As ESSL's Articles of Association prescribe, the laboratory both performs research by itself and supports research throughout Europe.

Regarding research itself, 2011 was a year in which ESSL participated in a wide range of projects. These ranged from the FP7 Project EWENT (Extreme Weather impacts on European Networks of Transport), to the project Severe Thunderstorm Evaluation and Predictability in Climate Models (STEPCLIM) that will be carried out until 2015. With the UK Met Office, ESSL was involved in a small project on the future climate of hailfall in Europe, and yet another small project, on Mediterranean Cyclones started on order of EUMETSAT.

Besides these projects, 2011 was also a year in which the pre-existing core activities of ESSL received a lot of attention: the 6th European Conference on Severe Storms was organized in Palma de Mallorca in cooperation with the Meteorology Group of the University of the Balearic Islands. This conference attracted no fewer than 223 scientists from 34 countries. At the conference, a new award was introduced in honour of ESSL's founder and former Director: the Nikolai Dotzek award. The first Dotzek award was presented to Dr. Paul Markowski for his tornado research.

2011 was an active year for the European Severe Weather Database as well, as its underlying data format was enhanced and implemented. It enables the recording of damaging lightning and of severe winter weather events: ice accumulation, heavy snowfall and avalanches.

An important step was made in 2011 by focusing on activities more tailored to operational meteorology. A first example is the cooperation with the Austrian Central Institute for Meteorology and Geodynamics (ZAMG) and Skywarn Austria in providing the technical infrastructure to display severe weather reports from the newly developed Trusted Spotter Network. Through a special interface, the severe weather database can now be used to view reports from this Network in real-time to support the operations of ZAMG forecasters.

The second and probably most important of ESSL's engagement in supporting forecast operations of the weather services is the decision to explore the possibility to carry out the ESSL Testbed, a programme to test new forecast-supporting products and techniques, simultaneously providing forecaster training. This move may be called a milestone, taken jointly by the Executive Board, the General Assembly and supported by the Advisory Council. It involved the founding of a new legal entity in Austria, the *European Severe Storms Laboratory – Science & Training*.

On the administrative side, a change in 2011 was the parting of a colleague from the Executive Board, Bernold Feuerstein, who has been part of the EB since the foundation of ESSL in 2006. A good replacement was found, however, in Kathrin Riemann-Campe, who was elected by the General Assembly to take office in January 2012.

Financially, 2011 has been a modestly successful year in which ESSL operations were slightly positively balanced. This is a stark contrast to the year before, that saw a rapid consumption of ESSL's financial reserves. Nevertheless it is clear that more funds are needed to fully profit from the potential that those involved with ESSL have.

In fact, it good to state that ESSL still strongly relies on work that many of its employees, members and others carry out voluntarily. ESSL as an organization is indebted to them, and I herewith would like to take the opportunity to thank them. As a Director, my goal for the coming 2 to 3 years is to create fully paid employment for a small ESSL core team. We will engage in new third-party projects of high scientific quality, and explore options for continuous funding without losing our identity.

With that, I present you this Annual Report that contains the details of the topics I referred to above, and which constitutes a review of ESSL's achievements in its fifth full business year.

Pieter Groenemeijer
ESSL Director

Wessling, 16 August 2012

2 Science and research

2.1 The European Severe Weather Database

A major building block of ESSL's scientific activities is the application of its European Severe Weather Database (ESWD) to climatological studies of severe thunderstorms in Europe, such as in the STEPCLIM project. Other applications of the ESWD lie in the verification of forecast and nowcast products, or warnings. These are carried out in collaboration with parties such as the national weather services. Evidence of the use of ESWD by scientists throughout the world is that, during 2011, no fewer than 12 peer-reviewed scientific articles have appeared – to ESSL's knowledge – that used the ESWD.

2.1.1 Development of the dataset

In 2011, ESSL has continued its efforts to improve and enlarge the ESWD. For 2011, 7406 reports have been stored in the ESWD (requested at 12 July 2012), which is an increase of almost 33% compared to 2010. The spatial distribution of the reports is illustrated in Figure 2.1.

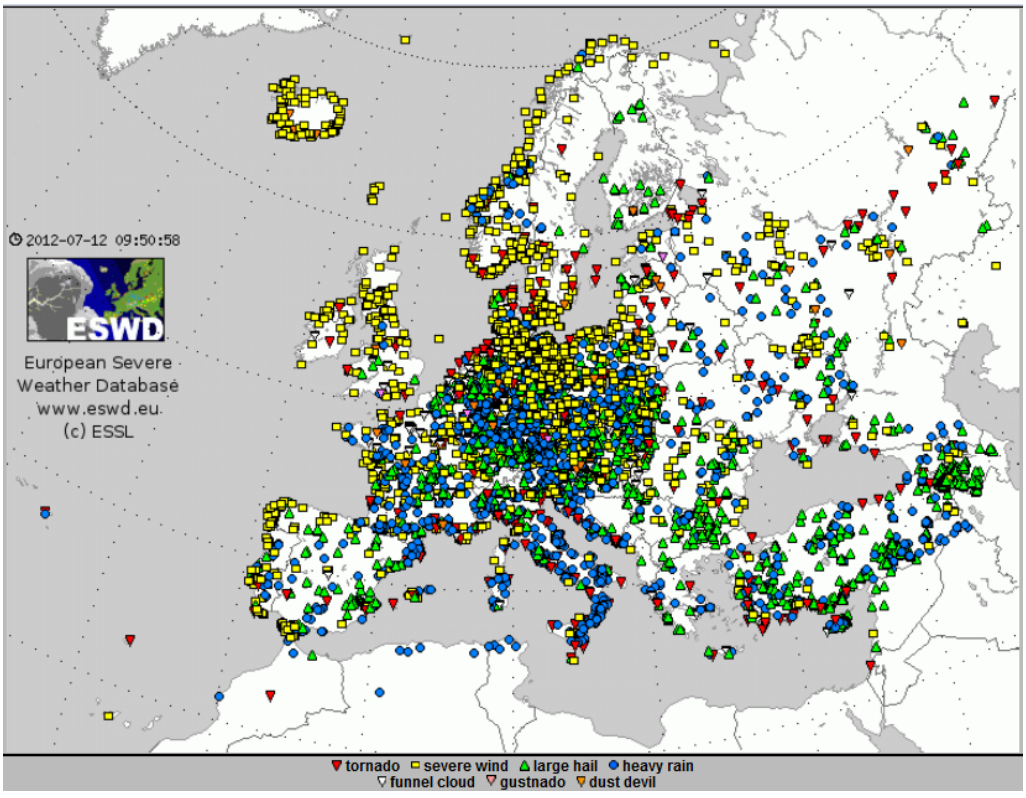


Figure 2.1: All 7406 reports from 2011 (requested at 12 July 2012).

All ESWD data are assigned one of the following quality levels: QC0, QC0+, QC1, or QC2, which mean that the data have undergone different levels of quality control. The data format descriptions downloadable from ESSL's publications website provide the details.

The work of the ESSL quality control team in addition to the efforts by ESSL's partners has led to a marked increase of events that could be *confirmed by reliable sources*, which is the definition of QC-level 1. In 2011, more than 75% of the reports have a QC-level of QC1 or higher (see table).

QC level	Number of reports	Percentage of all reports
QC0	370	5
QC0+	1430	19.3
QC1	5573	73.9
QC2	133	1.8
Σ	7406	100

Distribution of QC level of 2011's reports (status on 12 July 2012).

2.1.2 Technical enhancements

In 2011, the ESWD has been upgraded to version 4.0, which was launched on 31 December 2011. Most changes in version 4.0 were carried out through the EU 7th Framework project EWENT (Extreme Weather Impacts on European Networks of Transport). These changes include:

1. An enlargement of the number of event types. The original event types, which are usually of convective nature: dust devil, funnel cloud, gustnado, heavy rain, large hail, tornado and severe wind events were complemented by winter event types and damaging lightning (see below).
2. The inclusion of data from three further countries into the ESWD, namely Austria, Cyprus, and Finland.
3. the translation of the ESWD webpage in fourteen different languages. In 2011, the following four langauges were added: Portuguese, Estonian, Turkish and Russian

The following event types were added:

- heavy snowfall/snowstorm

  Definition: Snow (or snow grains) and/or snowstorm in an amount that causes - or is capable of causing - important disruptions of daily life and/or considerable material or economical damage

- ice accumulation

  Definition: Accumulations of ice on the earth's surface and/or objects (such as power lines) in an amount that causes - or is capable of causing - important disruptions of daily life and/or considerable material damage or economical damage, not including ice accumulations resulting primarily from snowfall. Ice accumulations may result from freezing rain, freezing drizzle, freezing fog or from direct deposition of water vapour, resulting in glaze, frost or rime.

- avalanche

  Definition: A rapid flow of snow down a slope.

- damaging lightning

  Definition: A lightning strike causing important damage to aircraft, vehicles, ships, or injuring/killing people or animals.

In addition to these improvements, the ESWD now offers a "Nowcast Mode" to registered users. In this mode, the user can select a specific number of weather types, a quality control level and a region to be displayed, and is then presented a map and table of reports that updates automatically at a customizable time interval. This Nowcast Mode, as its name suggests, has been developed to support nowcasting (i.e. short-range forecasting) operations at weather services and was started by ESSL's involvement in the Trusted Spotter Network in Austria.

2.1.3 Trusted Spotter Network Austria (TSN)

The TSN is a cooperation between the Austrian central institute for Meteorology and Geodynamics (ZAMG), Skywarn Austria, and the European Severe Storms Laboratory.

A "trusted spotter" is a member of Skywarn Austria, who reports about significant or severe weather and consecutive damages to ZAMG, member of ESSL and the authority in charge of issuing weather warnings for Austria. Since these reports were formerly delivered by fax or email, the usability for immediate response by the forecaster was limited so far.

The TSN was established to build up a reliable network between spotters and operational forecasters. For this purpose ZAMG offers an individual training program for spotters, regular workshops and scientific support. and the provision of real-time weather information from ZAMG.

ESSL has developed the "Nowcast mode" for the European Severe Weather Database, that allows the display of the reports in real time on a map of Austria (on any other country in general), to benefit operational forecasting. Reports from "trusted spotters" are accepted by ESWD at the QC1 level (confirmed by a reliable source). Thus, forecasters

have reliable weather information from the TSN available in real time to evaluate and verify warnings.

2.2 Third-party funded projects

2.2.1 Severe Thunderstorm Evaluation and Predictability in Climate Models (STEPCLIM)

STEPCLIM is a four-year project that started in November 2011 at ESSL. The aim of this project is to develop a method which enables climate models to be used to determine the frequency and intensity of hail, tornadoes, severe wind gusts and flash floods.

STEPCLIM is part of the MiKlip reserach programme, funded by the German Federal Ministry of Education and Research in Germany (BMBF) with the aim to create a model system that can provide reliable decadal forecasts on climate and weather, including extreme weather events.

Within STEPCLIM, the European Severe Weather Database will be used intensively. For more information on STEPCLIM please visit the official STEPCLIM website at http://www.fona-miklip.de/en/350.php.

2.2.2 Evolution of Hail Storms over Europe in a Changing Climate

Within the project "Evolution of Hail Storms over Europe in a Changing Climate", funded by the AXA Research Fund, ESSL cooperates with the UK Met Office to develop a hail model to be used with the regional climate model.

Within the project, ESSL plays a consulting role and supports the Met Office with enhancements to the hail model and helps calibrate the model to observations. In 2011, various potential improvements to the hail model have been made and tested and an evaluation of the modelled hail stone characteristics and spatial distributions showed that they agreed reasonably well with observations. The project's end is planned in late 2012.

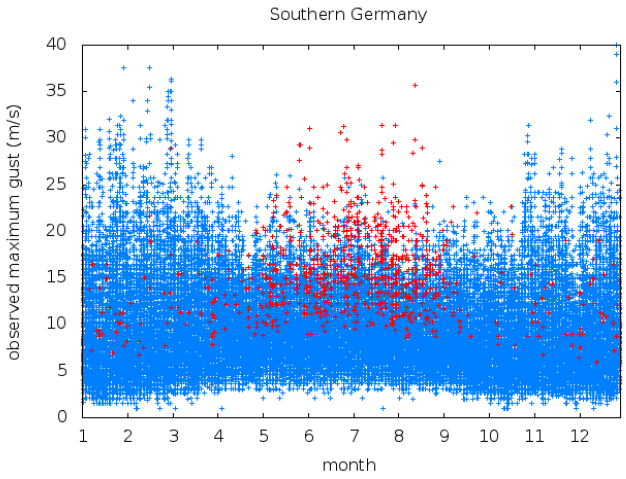
2.2.3 Extreme Weather impacts on European Networks of Transport

ESSL's work in the EU FP7 project EWENT (Extreme Weather impacts on European Networks of Transport) continued during 2011.

The objective of the EWENT project is to assess the impacts

and consequences of extreme weather events on the EU transport system. The project also evaluates the efficiency, applicability and finance needs for adoption and mitigation measures which will dampen and reduce the costs of weather impacts.

Within the 9-partner consortium, ESSL's role is, naturally, on the meteorological side of the project. In 2011, ESSL completed studies on two topics, the frequency of fog at airports and on the nature of extreme wind gusts and their representation in climate models. It has, for example, found that convectively induced wind gusts are poorly represented in coarse weather models, and that their occurrence therefore must be modelled using new techniques, work that ESSL is engaging in within the project STEPCLIM (see above). The study on fog occurrence confirmed a sharp decrease was observed at all European airports studies during the last 25 years.



Maximum daily wind gust at stations in southern Germany. Data source: European Climate Assessment & Data. The red observations are those that were underestimated by more than 50% by the ERA-Interim reanalysis dataset (source: FMI/ECWMF). The figure shows that the underestimated gusts occur mostly in summer.

Other activities of ESSL within EWENT have been an upgrade of the ESWD data format to version 4, which is detailed in section 2.1. In addition to the data format improvements, data from three further countries were included into the ESWD, namely Austria, Cyprus, and Finland, and finally, ESWD's accessibility was improved by adding four more languages to the web interface. Currently, the ESWD webpage can be displayed in fourteen different languages, now including: Portuguese, Estonian, Turkish and Russian.

2.2.4 Satellite Based Climatology of (Sub-) Tropical Cyclones in Europe

This EUMETSAT funded project started in November 2011. It focuses on storms that reveal a high level of subtropical or tropical cyclone type organization and can be observed on occasion on satellite imagery covering the Mediterranean Sea, the Black Sea, and the Atlantic Ocean southwest of the Iberian Peninsula.

This study's goal, as a first step to the development of an automatic detection of such systems, was to establish a first baseline climatology of their occurrence for the waters surrounding Europe. To obtain such a climatology, the manual Dvorak-Method was applied to Meteosat 1 imagery, from 2006 back to the onset of the operational meteorological satellite era in Europe in the year 1982.

According to the Dvorak method, suspect systems were classified as tropical depressions, storms or cyclones via assigning T-numbers (T for tropical) related to the satellite appearance of the systems – and for subtropical systems the Hebert and Poteat method was used to this aim. The results will be discussed during an invited talk at next EUMETSAT conference in 2012.

2.3 7th European Conference on Severe Storms (ECSS2011)

The sixth European Conference on Severe Storms (ECSS) took place at the L'Aljub, Museu Es Baluard in Palma de Mallorca, Balearic Islands, Spain, from 3 to 7 October 2011. The conference was organized in cooperation with the Meteorology Group of the Universitat de les Illes Balears.

In almost 100 talks and about 150 poster presentations, current scientific questions surrounding severe local storm phenomena were addressed. The conference room in which this took place was in fact a former storage basin for sweet water for the city and now part of the museum of modern and contemporary arts in downtown Palma.

The conference programme was comprised of 11 sessions focusing on various aspects of severe storms including microphysics and electrification, numerical modelling, forecasting & nowcasting, convective initiation, and remote sensing. The field of climatology was represented by the sessions on storm data and damage assessment, and on storm climate. In addition, there was a session on the impacts of storms on society. Two sessions were devoted to floods and flash floods and to extratropical, Mediterranean and tropical cyclones. One of the “hot topics” of the conference came from overseas: the field campaign VORTEX2 in the USA in 2009/10 investigating the origin of rotation in tornadoes and their near-surface winds by a manifold of measurement devices.

Group picture of the ECSS 2011 participants in Palma de Mallorca.

Vice versa, remote sensing – in particular multi-wavelength satellite imagery with high spatial and temporal resolution – is a field where European transnational research plays

a leading role internationally. Storm features, some of them representing storm severity, can be observed and analysed in real time, providing a complementary nowcast tool to radar and ground-based observations.

A total of 217 participants from 33 different countries, of which eight non-European, formed the ECSS and discussed their scientific findings in eleven sessions. The participants were offered the opportunity to publish their results in a special issue of the peer-reviewed journal 'Atmospheric Research', of which Prof. Climent Ramis of the University of the Balearic Islands is the Guest Editor.

2.3.1 Nikolai Dotzek Award

The Nikolai Dotzek Award 2012

Two awards have been presented during the ECSS Conference. In honor of ESSL founder Nikolai Dotzek, the ESSL board established the Nikolai Dotzek award to honor a scholar for *an outstanding contribution to the science of severe storms*. The award may be given for a breakthrough discovery presented at the conference, for an accumulation of important accomplishments during a scientific career, or as an encouragement to an outstanding young scientist with great potential. The award may also be given for a combination of these factors. The Award is endowed with a prize of € 1000, offers free participation to the next ECSS and includes a trophy in form of an artificial large spiked hailstone (see illustration).

At the ECSS 2011, the first Nikolai Dotzek award was presented to Paul M. Markowski, Pennsylvania State University State College, Pennsylvania, USA, for his outstanding work towards finding out why some supercell storms produce tornadoes and others do not. He has made important contributions toward answering this question by studying in detail the differences between tornadic and non-tornadic storms using data both from field observations and numerical modelling experiments. In addition to being a recognition of Dr. Markowski's great achievements, the award is intended as a strong encouragement to continue with this important work.

2.3.2 Heino Tooming Award

For the third time, the ESSL Board awarded the Heino Tooming award for the best collaborative work done by scientists from different European countries.

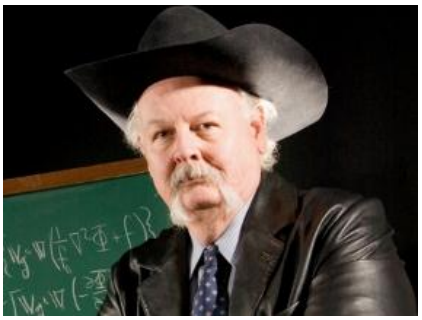
In 2011, Mária Putsay (HU), Martin Setvák (CZ), André Simon (HU) and Jochen Kerkmann (DE) were honoured for their contribution: 'Simultaneous BTD (WV6.2-IR10.8) anomaly and above-anvil ice-plume observed above the storm of 06 July 2010, North Italy'.

3 Publications and outreach

A wide range of outreach and PR activities have taken place in 2011. ESSL was present at the Extremwetterkongress (Extreme Weather Congress) for the germanophonic world, was well-represented with scientific contributions at its own European Conference of Severe Storms. At various other occasions, ESSL employees and members engaged in interaction with particular interest groups and the general public. In addition, ESSL's scientific work resulted in six peer-reviewed publications.

The ESSL website was further developed to include more downloadable information such as the Newsletters. Two ESSL Newsletters were released in 2011 to keep its members informed of the Association's activities. On the website, more information was added on how to acquire membership and how to obtain access to ESWD data for various user groups.

3.1 Convective Severe Weather Diagnosis and Forecasting Workshop



As a side event of the European Conference on Severe Storms in Palma, ESSL has organized a workshop in close collaboration with Dr. Charles Doswell III, suited to both forecasters and researchers who want to improve their skills of forecasting convective severe storms.

The unique aspect of this workshop was that the teams of participants prepared their own analysis, diagnosis, and forecast using the knowledge from the lectures of the preceding morning. The various forecasts were subsequently discussed, and the true outcome of the forecast disclosed. The workshop saw a maximum attendance of 20 people.

3.2 Hail Symposium

ESSL has organized a symposium on the topic "hail", sponsered by the Austrian hail insurance (Österreichische Hagelversicherung) in Krumbach, Austria from 26 to 29 September 2011. The event had an attendance of 48 people and featured lectures from experts in, for example, forecasting, numerical modelling, radar and climatology.

3.3 List of publications in peer-reviewed literature

Feuerstein, B. and P. Groenemeijer, 2011: In memoriam Nikolai Dotzek, *Atmos. Res.*, **100**, 306–309.

Feuerstein, B., P. Groenemeijer, E. Dirksen, M. Hubrig, A. M. Holzer, and N. Dotzek: Towards an improved wind speed scale and damage description adapted for Central Europe, *Atmos. Res*., **100**, 547–564.

Groenemeijer, P., U. Corsmeier, Ch. Kottmeier, 2011: The development of tornadic storms on the cold side of a front favoured by local enhancement of moisture and CAPE, *Atmos. Res*., **100**, 765–781.

Markowski, P. M., and N. Dotzek, 2011: A numerical study of the effects of orography on supercells, *Atmos. Res*., **100**, 538–546.

Brooks, H.E., P.T. Marsh, A.M. Kowaleski, P. Groenemeijer, T.E. Thompson, C.S. Schwartz, C.M. Shafer, A. Kolodziej, N. Dahl, D. Buckey: Evaluation of European Storm Forecast Experiment (ESTOFEX) forecasts, *Atmos. Res*., **100**, 538-546.

Pistotnik, G., A. M. Holzer, R. Kaltenböck, S. Tschannett, 2011: An F3 downburst in Austria—A case study with special focus on the importance of real-time site surveys, *Atmos. Res*., **100**, 765–781.

3.4 List of presentations and conference contributions

The ESSL and the European Severe Weather Database. Pieter Groenemeijer, Symposium 2011 Stiftung Schadenvorsorge und Umwelt, Neuhausen auf den Fildern, Germany.

Was Tornados so gefährlich macht – Eine Fallstudie zum Pfingstmontag-Tornado 2010. Bernold Feuerstein and Thilo Kühne, 6. Extremwetterkongress, Hamburg, 12–15 April 2011.

Tornados in Deutschland und Hamburg. Oliver Schlenczek, 6. Extremwetterkongress, Hamburg, Germany, 12–15 April 2011.

Das Unwetter vom 12. Juli 2010 auf Helgoland – Gab es einen Tornado? Oliver Schlenczek, 6. Extremwetterkongress, Hamburg, Germany, 12–15 April 2011.

Tornados im östlichen Europa. Thilo Kühne und Artur Surowiecki, 6. ExtremWetterKongress (EWK), Hamburg, Germany, 12-15 April 2011,

Die europäische Unwetterdatenbank ESWD: Ein qualitätsgeprüfter Datensatz und dessen Anwendung in der Wissenschaft, Thilo Kühne, Nikolai Dotzek [postum], Pieter Groenemeijer, Bernold Feuerstein, Alois Holzer, Susanne Haeseler, Zhongjian Liang, StuMeTa 2011, Freie Universität zu Berlin, Berlin (Germany), 4 Juni 2011

Die „European Severe Weather Database" (ESWD) als Datenplattform für Lawinenmeldungen. Alois M. Holzer, Jahrestagung 2011 der Lawinenwarndienste, Salzburg, Austria, 11 May 2011.

Overview of the European Severe Storms Laboratory. Pieter Groenemeijer, National Weather Center, Norman (OK), USA, 6 June 2011.

Overview of the European Severe Storms Laboratory. Pieter Groenemeijer, EUMETRAIN Convection Week online training, 9 June 2011.

Overview of the European Severe Storms Laboratory and the European Severe Weather Database. Pieter Groenemeijer, RMS, London, 17 August 2011

The representation of convective wind gusts in coarse numerical models. Pieter Groenemeijer, Heikki Tuomenvirta, Pauli Jokinen, and Andrea Vajda, 6th European Conference on Severe Storms, Palma de Mallorca, Spain, 3–7 October 2011.

Towards an improved wind speed scale vs. damage description adapted for Central Europe. Bernold Feuerstein, Pieter Groenemeijer, Erik Dirksen, Martin Hubrig, Alois M. Holzer, Thilo Kühne and Nikolai Dotzek, 6th European Conference on Severe Storms, Palma de Mallorca, Spain, 3–7 October 2011

New Event Types for the European Severe Weather Database (ESWD). Alois M. Holzer, Pieter Groenemeijer, Nikolai Dotzek, Bernold Feuerstein, Thomas Krennert, Thilo Kühne, Zhongjian Liang and Susanne Haeseler, 6th European Conference on Severe Storms, Palma de Mallorca, Spain, 3–7 October 2011

The Pentecost Monday tornadic supercell in eastern Germany on 24 May 2010. Bernold Feuerstein and Thilo Kühne, 6th European Conference on Severe Storms, Palma de Mallorca, Spain, 3–7 October 2011

Quality of radio/television weather warnings in the eyes of the Austrian public. Alexander Keul, Alois Holzer and Thomas Wostal, 6th European Conference on Severe Storms, Palma de Mallorca, Spain, 3–7 October 2011

Trusted Spotter network Austria. Thomas Krennert, Alois Holzer, Michael Staudinger, Mathias Stampfl and Christian Ortner, 6th European Conference on Severe Storms, Palma de Mallorca, Spain, 3–7 October 2011

Using historical information sources to reconstruct historical severe storm cases in Central Europe. Thilo Kühne and Heiko Wichmann, 6th European Conference on Severe Storms, Palma de Mallorca, Spain, 3–7 October 2011

The European Severe Storms Laboratory in a nutshell. Pieter Groenemeijer, Meteorologisches Institut München, LMU, Munich, Germany, 17 November 2011.

Research at the European Severe Storms Laboratory. Institut für Meteorologie und Geophysik, Universität Wien, Vienna, Austria, 17 November 2011

4 Financial and administrative report

4.1 Auditing and employment

As announced in the General Assembly in Palma, in 2011 ESSL changed its independent and sworn certified financial auditor from Ohland und Partner GbR to René Schaeffler GmbH. Therefore, for the new auditor these were the first annual accounts to audit for ESSL.

The annual accounts for 2011 are shown the way the financial auditor prepared and delivered them to the Executive Board. Section 4.2 contains the details. Summarizing our certified financial auditor states in D.I. and II. (translation from the German original):

"Recording of income, expenditure and receipts:

… Our activities do not give reason for any doubt in formal and physical correctness and conclusiveness of bookkeeping.

Recapitulatory annual accounts:

… Our activities do not give reason for any doubt in correctness of the annual accounts."

The original was duly forwarded to the Advisory Council.

An external payroll accountant was mandated during 2011 to take care of paperwork and bureaucratic handling of taxes and social insurances, which would otherwise exceed ESSL's internal administrative capacities.

In 2011, the ESSL has been employer for four part time employees (ESSL Director – full time starting November 2011 within the STEPCLIM project, ESSL Treasurer, ESWD quality control manager and Assistant to the Board), and three so-called "Mini-Jobbers", a form of minor employment according to the German law (ESSL Deputy Director, ESWD quality controller and IT Developer). So, in total 7 employees were engaged in ESSL operations for at least part of the year.

As required by the tax authorities, cost centres distinguish between the ideational branch of ESSL (*Ideeller Bereich*, i.e. management of the association) and its branches directly serving the statutory purposes of the ESSL (*Zweckbetriebe*). No activities had to be booked under the commercial type branch (*wirtschaftlicher Geschäftsbetrieb*) in 2011 – although allowed to some extent, thus fulfilling the requirements of the tax authorities.

4.2 Financial status 2011

The fifth full accounting year was dominated by the cooperation with our new tax advisor and by the ECSS 2011. The ECSS every second year leads to a higher business volume

than in the years without a conference. The accounting for 2011 can be found in the Appendix A.1.

The following figures from the annual accounts underline the higher volume compared to the year before:

26.867,00 EUR of membership fees and donations were obtained (17.200,98 EUR in 2010).

65.232,82 EUR (in 2010 69.769,22 EUR) were obtained in scientific projects, 88.127,82 EUR (in 2010 10.627,84 EUR) from scientific conferences and meetings (ECSS and hail symposium), from given presentations and consulting 16.600,00 EUR, from interest 135,87 EUR and from VAT 4.071,68 EUR.

Including taxes, **total income** summed up to **209.635,19 EUR** (90.823,08 EUR in 2010).

Including taxes, **total expenses** summed up to **202.541,87 EUR** (137.682,85 EUR in 2010).

The major cost factors were personnel costs with 110.960,91 EUR (of this, 87.572,82 EUR for salaries and 23.288,09 EUR for social security), ECSS payments to the local organizer (33.550,00 EUR), and travel expenses with 25.559,74 EUR. Tax advisor and external bookkeeping costs as well as expenses for legal advice were reduced substantially. Further details can be found in the expenditure section of Appendix A.1.

At the end of the business year, liquid assets at our bank accounts amounted to 36.258,91 EUR (compare: 29.130,59 EUR at the end of 2010 and 78.138,36 EUR at the end of 2009). In summary, the financial figures for 2010 showed a stabilizing trend, as expected in the financial planning for 2011.

The annual result is a positive 7.093,32 EUR (compare: negative 46.859,77 EUR in 2010, positive 60.599,84 EUR in 2009).

The financial planning for 2012 foresees stable financial liquidity levels with a slightly smaller volume (in a non-ECSS year), based on the scientific project Stepclim and increased membership fees.

4.3 Foundation of “ESSL Science and Training”, an Austrian subsidiary association

In the course of 2011, the ESSL Board conceived the idea of the ESSL Testbed, a facility to both enhance the transfer of research developments into operational weather forecasting and to train Europe’s weather forecasters regarding severe storms.

To organize the Testbed with a high level of independence, and in vicinity and in cooperation with ESSL’s members ZAMG and AustroControl, furthermore taking into

account that ESSL already employed three Austrian staff, the ESSL Board proposed the General Assembly in October 2011 to found a subsidiary Association in Austria. Approving the proposal the GA mandated the EB to do carry out this plan and organize the Testbed as long as an adequate financial basis could be found.

On 8 November 2011, the official ESSL subsidiary *"European Severe Storms Laboratory – Science and Training"* was founded. The ESSL - Science and Training has its seat in Wiener Neustadt, Austria, with the status of *benefit to the public* registered in the Austrian Register of Associations. The founders are Alois M. Holzer and Pieter Groenemeijer, who act as Director of Operations and Director, respectively.

The foundation of ESSL – Science and Training marked an important step in allowing the Testbed to be organized, for example to be able to rent premises where the actual Testbed could be carried out. During much of 2011 intensive contact with potential partners were carried out including but not limited to EUMETSAT, DWD, ZAMG, the City of Wiener Neustadt, the Province of Lower Austria and DLR. As part of the preparation, the Director paid a visit to the organizers of the United States based Hazardous Weather Testbed (HWT), the Storm Prediction Center and the National Severe Storms Laboratory in early June 2011.

In fact, the first idea of an ESSL Testbed was formulated late in 2010: a place where researchers and developers of forecast-supporting products and the users of those products, the forecasters, interact directly by jointly performing forecasting tasks at a particular location.

4.4 ESSL members and membership fees

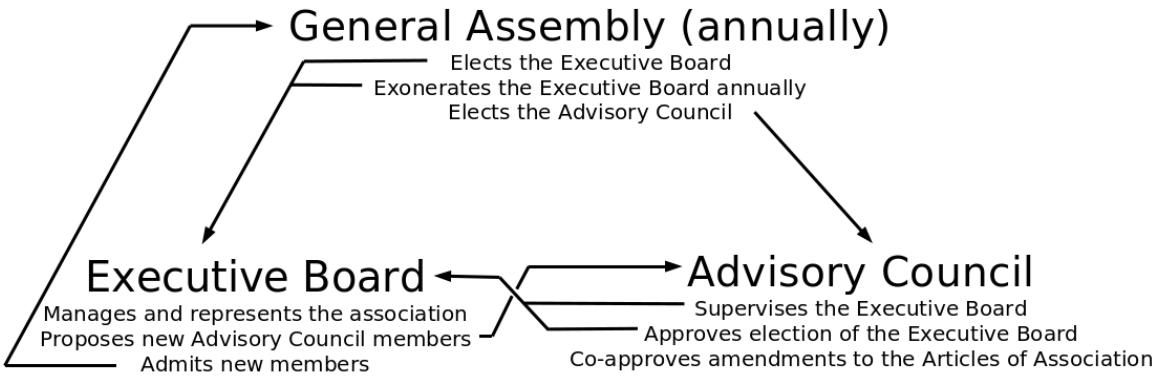
ESSL has four categories of members (individual full, individual supporting, institutional full and institutional supporting). The contribution of institutional members through their membership fees constitutes an important source of income for ESSL, that in 2011 amounted to 26,260 EUR.

In 2011, each category had one fixed membership fee. At the General Assembly in Palma, the Executive Board proposed to change this for institutional full members, and make their fees dependent on the size of the member organization and the economic background of its country. In addition, a very modest raise of the supporting institutional member fee was proposed. This proposal was accepted and has become effective in 2012. Full details are listed in Appendix A3.

In 2011, ESSL could welcome 7 new members. Among ESSL's natural partners, the National (Hydro-)Meteorological Services, two new members were welcomed: the Czech Hydrometeorological Institute CHMI and the Finnish Meteorological Institute (FMI). The German Aerospace Center DLR became an institutional supporting member, as well as Risk Management Solutions (RMS). Christoph Gatzen, Alexander Keul and Kathrin Riemann-Campe were admitted as individual full members.

4.5 Executive Board and Advisory Council

The Executive Board and the Advisory Council are two of the three bodies forming the ESSL. The figure outlines these and their responsibilities.



Bodies of the ESSL. The Advisory Council consists of six members from two groups (three members each): (1) Science, (2) NMHS / EUMETNET.

4.5.1 Executive Board

In 2011, the Executive Board consisted of:

- Dr. Pieter Groenemeijer, Director
- Dr. Bernold Feuerstein, deputy Director.
- Dr. Aurora Bell, deputy Director
- Dr. Victor Homar Santaner, deputy Director
- Mr. Alois M. Holzer, Treasurer.

In summer, Bernold Feuerstein announced that he would step down as a Board member because of the increasing need for him to focus on tasks under his responsibility that are unrelated to ESSL. The Executive Board took the initiative to fill the open position by contacting its members and network. This resulted in an application of two people, of which Dr. Kathrin Riemann-Campe's was successful as she was elected Deputy Director at the General Assembly, after being recommended by the Advisory Council, effective from 1 January 2012.

Dr. Kathrin Riemann-Campe

has studied Meteorology in Hamburg. During an exchange semester she worked with Harold Brooks at the University of Oklahoma. She obtained her PhD at the University of Hamburg for her work at the Max Planck Institute for Meteorology. Currently, she has a Postdoc position at the Sea-Ice Physics Department of the Alfred Wegener Institute, Bremerhaven.

4.5.2 Advisory Council

At the Advisory Council meeting on 20 September 2011, Hans-Joachim Koppert was elected unanimously as vice chair of the Advisory Council. Terms of office for two members of the Advisory Council end on 31 December 2011, in both cases their first terms: Prof. Robert Sausen and Dr. Michael Staudinger. Both expressed their readiness to candidate for a second term of office and were re-elected by the General Assembly.

Appendix A1: Annual Accounts 2011

Allocation of Profit 2011 due to German Tax Regulations (Financial Reporting 2011) and Verification of Compliance with Local Regulations for Non Profit Organisations by the financial auditors René Schaeffler GmbH, Munich.

Tax profit statement for the period from 01.01.2011 to 31.12.2011
European Severe Storms Laboratory e.V., Wessling

Income and Expenditure	EUR	Year before EUR
1. Income		
Contributions:		
EU (EWENT) [i]	43.268,00	13.680,00
Stepclim (Ministry of Research, Germany)	21.964,82	-
ECSS Vaisala, Symposium Austrian Hail Insurance	16.500,00	-
Other ECSS (Munich Re)	10.000,00	2.000,00
	91.732,82	**15.680,00**
Income from		
Scientific meetings (ECSS with VATID) [ii]	30.310,00	10.627,84
Registration fees (ECSS with VAT 7 %) [iii]	31.317,82	42.474,75
Presentations (and consulting, DWD and UKMO)	16.600,00	-
Project EUMETSAT	8.600,00	-
Interest	135,87	312,26
Other	-	674,37
	86.963,69	**54.089,22**
Membership Fees [iii]	26.260,00	16.260,98
Donations	607,00	940,00
VAT	4.071,68	3.852,88
	209.635,19	**90.823,08**

i. The public contribution from the EU is related to a project with Teknologian Tutkimuskeskus VTT in Finland. The name of the project is EWENT.
ii. Income from scientific meetings is related to presentations at the European Conference on Severe Storms in Spain.
iii. For income from registration fees and for an amount of EUR 8.250,00 of membership fees VAT is applicable.

Income and Expenditures (footnotes overleaf)	EUR	Year before EUR
2. Expenditures		
2.1 Personnel costs		
Salaries	87.572.82	67.432,91
Social Security	23.288,09	13.338,70
Social Security Minijobs	-	146,32
	110.960,91	**80.917,93**
2.2 Depreciation		
Depreciation of fixed assets	823,00	165,71
Depreciation collected items 2008	61,00	61,00
Depreciation collected items 2009	200,00	200,00
Depreciation low value assets	-	379,00
	1.084,00	**805,71**
2.3 Other Expenditures		
ECSS conference	**33.550,00**	-
Travel costs and other expenditures	**25.559,74**	**10.858,46**
Support for ECSS participants [i]	5.920,00	-
Third party services (payment services, presenters and shuttle service hail symposium, printing and advertising costs) [ii]	5.078,52	3.069,98
Bookkeeping and costs for the annual accounts	7.591,05	12.303,25
Legal advice	4.584,46	14.322,50
Office material	2.134,64	959,58
Telephone and internet	1.471,51	1.390,30
Licences	449,00	-
Postages	448,71	285,08
Bank costs	170,21	85,30
Magazines and books	57,71	29,62
Other year before	-	1.069,58
	27.905,81	**33.515,19**
Neutral costs		
Input VAT	3.242,43	1.825,18
VAT prepayments	238,98	6.630,60
VAT not deductible	-	3.129,78
	3.481,41	**11.585,56**
	90.496,96	**55.959,21**

[i] The support for ECSS participants covers participation fees and travel costs from third countries.
[ii] Third party services are mainly costs for an external online payment service, which handles credit card payments for the ECSS and for membership fees.

Statement of assets per 31st December 2011

ASSETS	EUR	Year before EUR	**EQUITY**	EUR	Year before EUR
A. FIXED ASSETS			A. EQUITY		
Tangible Assets			I. Retained earnings		
			1. General reserves	8.046,28	8.046,28
Equipment	2.113,00	2.148,00	2. Current reserves	14.500,00	7.700,00
				22.546,28	15.746,28
B. CURRENT ASSETS			II. Profit to be carried forward	15.532,31	
Cash at bank	36.258,91	29.130,59	1. Ideational Sector	14.603,59	14.592,98
			2. Other tax privileged special purpose activities	1.889,76	1.889,76
			3. Asset management	336,74	128,57
			4. Other business activities	-1.297,78	41,59
			III. Remaining profit current year	**293,32**	-1.120,59
	38.371,91	31.278,59		38.371,91	31.278,59

Annual Accounts 2011	**Ideational sector**	**Special purpose activities**	**Asset management**	**Other business activities**	**Total EUR**
PROFIT/LOSS	**-41.878,12**	**48.835,57**	**135,87**	**0,00**	**(PROFIT) 7.093,32**
Release of current reserve	7.700,00	0,00	0,00	0,00	7.700,00
Exchange internal sectors	34.178,12	-34.178,12	0,00	0,00	0,00
Subtotal	0,00	14.657,45	135,87	0,00	14.793,32
Buildup of current reserve	0,00	14.500,00	0,00	0,00	14.500,00
Remaining PROFIT/LOSS according to tax regulations	**0,00**	**157,45**	**135,87**	**0,00**	**TAX PROFIT 293,32**

Appendix A2: Member list 2011

The following table shows all ESSL members as of 31 December 2011, sorted according to their ESSL-ID (which corresponds in ascending order to the beginning date of the ESSL membership). The 9 remaining founding member names are printed in italics. The given country corresponds to the main residence or statutory seat, not necessarily to the nationality.

INDF .... Individual Full Member
INDS .... Individual Supporting Member
INSF …. Institutional Full Member
INSS …. Institutional Supporting Member

INDF	*Dr. Bernold Feuerstein*	*GERMANY*
INDF	*Dr. Dario Giaiotti*	*ITALY*
INDF	*Dr. Pieter Groenemeijer*	*GERMANY*
INDF	*Alois M. Holzer*	*AUSTRIA*
INDF	*Dr. Maria-Carmen Llasat-Botija*	*SPAIN*
INDF	*Dr. Romualdo Romero*	*SPAIN*
INDF	*Dr. Martin Setvák*	*CZECH REPUBLIC*
INDF	*Dr. Fulvio Stel*	*ITALY*
INDF	*Jenni Rauhala*	*FINLAND*
INDF	*Thilo Kühne*	*GERMANY*
INDF	*Helge Tuschy*	*GERMANY*
INDF	*Mag. Georg Pistotnik*	*AUSTRIA*
INDF	*Zhongjian Liang*	*GERMANY*
INDF	*Lionel Peyraud*	*SWITZERLAND*
INDF	*Mag. Thomas Krennert*	*AUSTRIA*
INDF	*Dr. Johannes Dahl*	*USA*
INDF	*Martin Hubrig*	*GERMANY*
INDF	*Oliver Schlenczek*	*GERMANY*
INDF	*Victor Homar Santaner*	*SPAIN*
INDF	*Sanjay Sharma*	*INDIA*
INDF	*Dr. Aurora Bell*	*ROMANIA*
INDF	*Sorin Burcea*	*ROMANIA*
INDF	*Bogdan Antonescu*	*ROMANIA*
INDF	*Dr. Marianne König*	*GERMANY*

INDF	*Dr. Volker Gärtner*	*GERMANY*
INDF	*Dr. Michael Kunz*	*GERMANY*
INDF	*Erik Dirksen*	*GERMANY*
INDF	*Emmanuel Wesolek*	*FRANCE*
INDF	*Christoph Gatzen*	*GERMANY*
INDF	*Dr. Alexander Keul*	*AUSTRIA*
INDF	*Dr. Kathrin Riemann-Campe*	*GERMANY*
INDS	*Casper ter Kuile*	*NETHERLANDS*
INDS	*Stefan Meulemans*	*SWITZERLAND*
INSF	*DWD, Deutscher Wetterdienst*	*GERMANY*
INSF	*EUMETSAT*	*GERMANY*
INSF	*AUSTRO CONTROL*	*AUSTRIA*
INSF	*ZAMG, Zentralanstalt für Meteorologie und Geodynamik*	*AUSTRIA*
INSF	*NMA, National Meteorological Administration of Romania*	*ROMANIA*
INSF	*FMI, Finnish Meteorological Institute*	*FINLAND*
INSF	*CHMI, Czech Hydrometeorological Institute*	*CZECH REPUBLIC*
INSS	*Münchener Rückversicherungs-Gesellschaft AG*	*GERMANY*
INSS	*Tokio Marine Technologies LLC*	*USA*
INSS	*Willis Ltd*	*UNITED KINGDOM*
INSS	*Deutsche Rückversicherung*	*GERMANY*
INSS	*DLR; Deutsches Zentrum für Luft- und Raumfahrt*	*GERMANY*
INSS	*RMS, Risk Management Solutions*	*UNITED KINGDOM*

Appendix A3: Membership Fees

INSTITUTIONAL FULL MEMBERS

current fee: 750 Euro for all

Formula: **fee = S x N / 70 in Euro**

rounded upward to the next multiple of 100 Euro

S is size category (see below)

N is nominal GDP per capita of the country in Euro

(source: Eurostat, and if not available: World Bank)

Size categories:

No. of employees less than...	size category
200	**1**
500	**2**
1000	**3**
1500	**4**
2000	**5**
	6

Example values:

	N = nominal GDP per capita in Euro				
S	**5000**	**10000**	**20000**	**30000**	**40000**
1	100	200	300	500	600
2	200	300	600	900	1200
3	300	500	900	1300	1800
4	300	600	1200	1800	2300
5	400	800	1500	2200	2900
6	500	900	1800	2600	3500

INSTITUTIONAL SUPPORTING MEMBERS

No. of employees less than...	new fee	*current fee*
11	800	*750*
101	2700	*2500*
1001	5500	*5000*
	6500	*5000*