Minutes ENRAM meeting in De Bilt / Utrecht, Royal Netherlands Meteorological Institute (KNMI), 27-28 Oct 2015

Compiled from notes taken by Cecilia Nillson, Jan Blew, Adriaan Dokter, Hidde Leijnse

Plenary session

27 October 2015, 9:00-17:00

Cecilia Nilsson- Presented the site of the calibration campaign in southern Sweden, Kullaberg nature reserve. Described the setup: Swiss birdscan VLR, Italian marine radar, British insect VLR and the Lund tracking radar, all approximately 20km from the newly upgraded weather radar in Ängelholm. Also presented the preliminary results of the Lund tracking radar. 8 nights of tracking done, about 700 birds tracked. Directions and speed similar to previous results from nearby areas.

Baptiste Schmid presented the new birdscan VLR. Similar to the entomological VLR of Rothamsted, the radar has a nutating beam, such that also flight direction of the birds can be estimated. **Felix Liechti** then presents results of birdscan radar from Kullaberg calibration campaign. The number of targets on the birdscan VLR where correlated with the number of birds tracked by the Lund tracking radar. The bird scan radar showed much lower altitudes and lower groundspeeds than the Lund tracking radar. Low altitude targets are probably underestimated by the tracking radar, while the low groundspeeds in the birdscan radar might be due to errors in the speed calculation, in particular incorrect. The mean track directions where very well correlated between the birdscan and the tracking radar.

Martina Scacco and MARCO Cianchetti- Presented the work they did as ENRAM STSMS during the Kullaberg calibration campaign. Marco introduced their marine radar and the type of data they get and Martina presented the data from Kullaberg. The altitude distribution was similar to the Swiss Birdscan VLR, and mean directions matched up with the birdscan and the Lund tracking radar. Martina also investigated differences between birds flying in what was identified as forward and reverse directions, and birds flying in reverse direction flew slower than birds indentified as flying in forward directions.

Jason Chapman: presented the results of the insect VLR at the Kullaberg campaign. Due to technical problems the radar unfortunately joined the campaign late into the insect migration season. Some insects were still detected, mostly in the last parts of September, but the numbers were overall quite low. During some nights there seems to be some movements of very small insects, but this could also be weather related artifacts. Jason also gave an update on the VLR they installed in Texas, USA. The densities of insects at these southern latitudes was overwhelming, up to the point that the VLR could no longer resolve single targets. Therefore no information on insect size and flight speeds/directions could be obtained.

Jason also explains that at the university of Exeter both a bird and insect VLR will be installed close to a dual-pol weather radar. This will produce a continuous inter-comparison campaign – it is therefore interesting to establish collaboration.

Coffee

Nadia Weisshaupt – presented the ENRAM STSM she did with Volker Lehmann, Observatorium Lindenberg-DWD, Germany. During spring 2015 she did measurements of bird migration with an infra-red camera next to a wind profiler to calibrate the data of the wind profiler. A big challenge was to separate different copies of the same echo in the beam, because a wind profiler beam has many side lobes. She concluded that she could determine flight altitude, wing beat pattern, migration intensity and distinguish birds from other objects. Migration traffic rate was however difficult to determine.

Sevgi Zubeyde Gurbuz – Presented the ENRAM STSM she did the 18-24th of October 2015 in sempach, Switzerland. She worked on the classification algorithm of the birdscan radar, using different parts of the wing beat frequency to classify objects. She tried different types of machine learning algorithms to correctly classify known targets. The Grenchenberg database of visually confirmed targets was used. Classes for classification were insects, birds, passerines, wader, and others. As explanatory variables were used: distance, wingbeat frequency, its derivative, number of pauses, length of flapping pauses vs beating pauses, polarization ratio and RCS. Also several generalized features were used 1st-4th cepstrum Added genearlized features: 1st-4th cepstrum coefficients, predicting coding coefficients, discrete cosine coefficient, but these classifiers did not improve the classification very much. Dealing with NULL features was a challenge, and how this was implemented had a big impact on classification results. Models improved up to about 10 features – adding more features did not lead to much improvement. The random forest approach seemed to work best and wing beat frequency seemed to be the variable with the most power to classify objects.

Sevgi also gave a short update on the situation with the weather radars in Turkey. Data from them are available for ENRAM applications, but from a biological point of view mountains might be a problem.

Lunch

Adriaan Dokter – Presented the STSM he did at Lund University during summer of 2015. The goal of the STSM was to investigate the dusk and dawn ascent of Common swifts. During the STSM the behavior of rapid ascents and descents during dusk and dawn were confirmed to take place also in Sweden, and as the nights get shorter during the summer the peaks merge and the birds stay at high altitudes all through the short nights. There was also a suggestion of a social dimension, in that the accents in the evening and the descents in the morning often were done in flocks.

Denise Ade – presented the work she did as an ENRAM STSM at the Swiss ornithological institute with Felix Liechti, 01-27/9 2015. She compared bird migration gathered by a pencil beam radar in Denmark (2009 season) with weather radar data of the Stevns radar. The data from the different systems did not match very well. One problem was that at very high wind speeds in February, the algorithm gave false positive detection of migration. Adriaan suggested this is likely because the target speeds then exceed the unambiguous velocity of the radar, a known limitation of the algorithm. For 2010 very little echoes were detected, suggesting that the Danish weather service applies a form of filtering, but which the biological echoes are (unintendedly) removed.

A discussion on how the detection algorithm needs to be adjusted to different weather services different systems followed.

Gonzalo Muñoz – Presented an STSM that Viviana Stanzione did with him. They wanted to compare weather radar outputs from Seville and Malaga with a Merlin bird dedicated radar at Gibraltar. There was difficulty in extracting the bird targets from the weather radar, and probably some rain remained in the sample. Seville and Malaga were not correlated with each other, which they were not expected to be either.

Matti Leskinen – Presented some thoughts about how to detect insects with non-dualpol weather radar measurements. Ground clutter removal is very important, and one can also use the fact that insects tend to not fly when it is too cold, such as under 5 °C? Matti suggested that environmental data such as temperature needs to be integrated in the detection algorithm for it to be effective. A discussion document by Jarmo will be circulated to the WG1 members, which give a detailed description of the proposed methodology

Coffee

Adriaan Dokter - presents STSM that he and Hidde Leijnse did with Gunter Haase at the Swedish weather service. Opera, odyssey and baltrad are explained. The goal of the STSM was to make the bird detection algorithm more generic and to make it possible to integrate the algorithm in the baltrad toolbox. European composite images were shown of reflectivity. These data suggested there is a surprisingly large difference in performance of the algorithm when applied to different countries radar. Some countries seem to apply some form of filtering that removes biological scattering – while OPERA member states are to send their data as unfiltered as possible, apparently this is not always the case yet. This makes it important to visually examine the output to make sure it is reasonable before continuing with analyses. A milestone was achieved in that the algorithm now works in the baltrad development environment, which is the same server as the operational production server of Baltrad.

Adriaan and Hidde also gave an update on the **availability of weather radar data**. Currently for 7 countries radial velocity and reflectivity data is arriving at Baltrad – there are many toothing problems still within the meteorological community, both in terms of data quality and data formats. Everybody is given the strong advice to **only use data in ODIM-h5 format** (the opera data model in HDF5), and not on data stored in local national archives in different formats, for which there is no/limited support. A lot of work is involved in converting and testing these older formats, which often requires direct involvement of the local weather service. Adriaan also warns not to over-ask your local weather service when there is no formal project / funding

Adriaan also updates on an **memorandum of understanding** that was sent to EUMETNET on behalf of ENRAM and Elena Saltikoff (the program manager of OPERA). This is to formally arrange the data exchange for scientific purposes between ENRAM and OPERA. The outcome of the October meeting at EUMETNET was that Elena was not yet not allowed to sign the MoU, but it was agreed to propose the MoU to the General Directors of the weather services to sign, in December. Individual countries will then have the option to opt out of the agreement.

Phil Stepanian- presents his plans for the post-doc he recently started in the UK with Jason Chapman. He will work with the UK dual-pol radar systems with ways to separate bird and insect targets. He also presents how dual-pol products can be used to identify the alignments of biological target, and to investigate drift in different situations.

Sergio Barbosa – Presents the Portuguese weather services radar station and examples of insect movement seen by them. Clear examples were given of convective weather, leading to distinct lines of insects that can be detected with the weather radar

WG1 break-out session
28 October 2015, 09:15-12:00

The open action points of the previous meeting in Israel are discussed first:
- Data permission. An MoU between OPERA and ENRAM is under consideration by EUMETNET. Decision is expected in December 2015; until then permission for data use is required from each individual country on a case by case basis.
- Infrastructure to store profile products: we work on an approach that profiles generated at SMHI will be transferred to KNMI; the online KNMI data center can there be used to make data accessible.
- A website will be put into place (accessible via enram.eu) where information can be found about where the algorithm has been tested, and about the quality of the weather radar data for estimating bird profiles. A description of how the data quality has been tested will be given on this website.
- Sevgi reports that Turkish data will most likely be available to the ENRAM community. The issue now is how to test the algorithms' outputs. Qualitative analyses (e.g. seasonal variation) of algorithm outputs by experts seems to be a good first option.

Training workshop

In 2016 we would like to organize a training workshop. Aims of the workshop: acquire basic knowledge of how to visualize and interpret the data (both raw PPIs and profiles of bird/insect densities). Volunteers for organizing/contributing to this workshop: Adriaan, Phil, Hidde. Timing: mid-2016 (check if there are no conflicting conferences). If possible the training workshop could take place back-to-back to the Malta ENRAM meeting; if this is not possible, it would another possible candidate would be Bulgaria? Much of the time should be spent with gaining hands-on experience. Charlotte has volunteered to turn the course material into an online training course: take video of lectures, and put this and course material on a website.

STSMs in 2016:

1. Sevgi and Phil to visit FMI/University of Helsinki (Jarmo/Matti) for the analysis of dual-pol radar data (end 2016)

2. Phil, Matti, and Jarmo to visit Turkey (Sevgi) for the analysis of dual-pol data, aimed at development of insect algorithm. March is the preferred time, but otherwise just before/after ERAD; October 2016.
3. Nadja to visit University of Amsterdam for analyzing bird migration over/around the Bay of Biscay.
4. Adriaan, Vlad and Hidde to visit SMHI for implementing the vertical profile algorithm at Baltrad, to analyse output, and to incorporate feedback into the algorithm (spring 2016).
5. Possibly STSMs that were planned for 2015 but were not carried out – inform with the people involved.

Joint WG 1&2 meeting:

1. Time: October 2016 (not conflicting with ERAD)
2. Location: preferably eastern Europe

Wishes for calibration campaigns:

1. Perform campaigns in Southern Europe (not too far south so that radars will not saturate).
2. Use well-calibrated reference radars (for testing weather radar algorithms)
3. Have a campaign close to a dual-pol weather radar (Exeter and Southern Europe), on well-tested weather radars that are representative for the network.
4. Need cases with mixture of birds and insects (i.e., preferably autumn).

Brainstorm for possible publications :

1. Single-pol insect algorithm (lead by Jarmo/Matti)
2. Methodological paper to document all the options of the bird profile algorithm (lead by Adriaan)
3. Identification of taxa from bird radars (lead by Sevgi)
4. Dual-pol weather radar classification algorithm (lead by Jarmo/Matti)
5. Case studies from weather radars in Portugal (Sergio)

Action points:

1. Phil to check the if data stream for the UK radars we're getting though Baltrad is the most optimal product for use in bird monitoring.
2. Adriaan/Hidde: continue to work on integrating the bird algorithm in the Baltrad toolbox and establish an operational data stream.
3. Adriaan to make a website with data availability/quality per OPERA radar.
4. All: to work on (local) funding for carrying out comparisons and algorithm development.
5. Hidde: to send R-script for visualizing bird profiles to Vlad and Denise.

6. Hidde to encourage ENRAM members to submit abstracts for the ERAD meeting in Turkey (October 2016).
7. Adriaan, Phil, and Hidde to organize training workshop.

WG2 break-out session

28 October 2015, 09:15-12:00

ENRAM Meeting, WG 2, 28. October 2015, 09:15 – 12.00

Participants: Felix Liechti (Chair), Jason Chapman, Robin Brabant, Forenc Dombai, Elena Patcev, Nadja Weisshaupt, Cecilia Nilsson, Gonzalo Munoz Arroyo, Myles Menz, Tansu Tuncali, Martina Scacco, Marco Chiancetti, Baptiste Schmid, Denise Ade, Boyan Michev, Pavel Zehtindjiev, Jan Blew (Minutes)

What has been achieved – STSM and other activities

Jason C.: collected insect data with a vertical scanning radar at Kullaberg, Sweden; however, insect migration did not take place. Collected with a similar radar insect data in Texas (close to Nexrad WR) (preliminary results presented the 1st day)

Felix L.: compared vertical bird radar with tracking radar at Kullaberg, Sweden (preliminary results presented the 1st day).

Marco C., Martina S.: collected at Kullaberg vertical scanning marine surveillance radar data (preliminary results presented the 1st day).

Cecilia N: collected for single nights tracking radar data at Kullaberg (preliminary results presented the 1st day); Cecilia also has historical tracking radar data for further comparisons; Kullaberg Weather Radar (WR) incl. dual polarisation feature, data currently not available, but will be (confirmed later by Adiraan).

Jan B: STSM on comparing pencil beam radar data (night migration) at Fehmarn, Germany and Denmark,2009 and 2010 to three Weather Radar (WR): Stevns (DK), Hamburg and Rostock (Germany); in the framework of Master Thesis Denise Ade (preliminary results presented the 1st day).

Robin B.: compared offshore Merlin Detect Radar to Belgian WR - density and speed data; a WR dataset with bird algorithm applied is sent daily including tables and figures; (Robin has the proposal to extend data analyses and validation experiments; money available).

Nadja W: compared wind profiler bird data with Infrared bird data; project keeps going (preliminary results presented the 1st day). (may compare wind profiler data to two WR at the Bay of Biscay, contacts to Spain established)

Gonzalo M.: compared DeTect data to 2 WR (Malaga, Sevilla), needs help to further analyse DeTect data, project may go on; ringing and visual observation data can be used;

Tansu T: Is running a Merlin (detect) system at the future airport of Istanbul and would like to compare data with a weather radar nearby.

Pavel Z. (short PPT presentation):
Comparison pencil beam radar BirdScan 1 with WR at the Black Sea (outside OPERA, but bird algorithm seems to work); 50 km distance; good correlation coefficient for data after sunrise and before sunset, not so good during the night; detected local bird movement at garbage bin prior to sunrise on the WR.
Compared road kills of birds (passerines) with bird radar data => negative correlation. A short MS is prepared. Suggests to also use visual observation data from 10 years standardized bird counts in Bulgaria for comparison with WR.

Elena P. (Croatia, new member of ENRAM): Has access to a horizontal/vertical x-band radar for bird detection. Is interested in validation experiments.

Publications planned with the existing data:

Jason C: Everybody must be aware that papers are important for the output of the Cost-Action. To be accepted as a ENRAM-contribution to the COST-Action a paper must have authors from at least two ENRAM-countries. A standardized sentence to acknowledge ENRAM and the Cost-Action can be obtained from Jason.

1) Kullaberg campaign (Cecila Nilsson (lead); Jason, Felix, Marco, Martina, Adriaan, Gunther Haase – 1 to 2 papers – one with meteorological, one with biological focus;
comparing / presenting phenology, height distribution etc. ;
data analyses to be ready end of 2015.

2) Fehmarn data: Jan, Felix, Vlad, Denise A. finishes Master thesis by April 2015; publication advised.

3) Nadja W., Mercedes – wind profiler vs. IR data (publication together with Volker Lehmann)

4a) Pavel Z., Boyan – bird road collision mortality vs. bird radar data (publication together with Felix L.), first draft exists;

4b) Pavel Z., Boyan – WR vs. bird radar (publication together with Adriaan and Hidde)

5) Robin B: - comparison of marine surveillance radar with WR – offshore; (publication together with Jan B. and Adriaan) – end of 2016

6) Gonzalo M. – comparison DeTect with WR, once results are ready; needs writer

Do we need more calibration / validation campaigns?

Jason: yes; especially places where both birds and insects are present;

where: east European flyway (Bulgaria, Turkey, Israel);

when: spring 2016 (in order to be able to analyse and publish); (Mar), April – May

Options:
European side of Istanbul, Turkey – possibly at the airport construction place, Merlin radar on site, WR close. Preconditions for selecting this site are: WR is dual-pol with good data quality (Sevgi will check availability of data and will send some test data to Adriaan/Hidde to check the performance. If possible an insect radar from Jason and a birdradar from Felix will be placed close to the Merlin system. Additional systems/sensors are welcome. Sevgi/Tansu will check permissions for Turkey.

Bulgaria: WR is not an OPERA radar, but has proven that bird algorithm work, but is not dual-pol; a bird radar is there.
Israel: WR and bird radar is there; not opera and unknown state of WR data format.

Preferred option: Local validation of several systems in Turkey, parallel data recording with WR and BR in Bulgaria and Israel (flyway).

Participants check options and re-convene / report end of November 2015. Please, report progresses to Felix.

Action plan 2016

Spring campaign in Turkey, April / May 2016 with support from Bulgaria and Israel WR

ERAD Meeting 10-14 October 2016, Antalya, Turkey; maybe submit 4-5 abstracts; maybe attach WG meeting (http://erad2016.org/) submission deadline 135.2016.

STSM proposals:

Tansu T. : compare satellite tagged White Stork migration with WR data (together with Judy SB);

Myles M: include the Falmouth site (UK) with bird, insect and dual-pol weather radar (plus Phil Stepanian). Myles needs to find somebody to do the work.

Marco/Gonzalo: anaylsis of Merlin data from the strait of Gibraltar

Martina (Italy): analyse data from Kullaberg, go to SOI, Switzerland will possible take place in 2015.

 Tie further STSMs into the spring 2016 campaign:
     e.g. moving radars, accompanying monitoring / ground truthing, trapping insects, butterfly transects;
     STSM 1 – somebody from Jason's group; STSM 2 – somebody from Felix' group.

Pavel Z: When do flocks of birds appear on the WR? Scare gulls at garbage dump, count them with drones or other, compare to WR; Pavel come to KNMI to analyse data (with Hidde).

Nadja W: in cooperation with WG 1 – WR Bay of Biscaya with wind profiler (with Adriaan/Hidde);

Elena (Croatia): is interested to get support for data analysis and validation of their radar system.

Plenary session
28 October 2015, 13:00-16:00

Both WGs report on their break out session

Discussion validation campaigns: Adriaan points out that the radars of both Israel, Bulgaria and Turkey are not (yet) part of OPERA. There is therefore a considerable risk that data quality and scanning schemes are different than most of the weather radars in the OPERA network – thorough testing of the algorithm and data quality is required before deciding on a validation campaign in these countries, i.e. generating bird profiles for an earlier migration season.

Southern France is suggested as a safe choice, however this country is problematic as we have no French ENRAM representative to make local arrangements for validation campaigns.

Next ENRAM MC meeting, all WGs: 18/19. (20) April 2016 on Malta;

training session WR data for WG 1 and 2 (basic skills to work with WR data, visualize, etc. – look at raw data; look at PPI plots etc; 1 – 3 trainers (Hidde, Adriaan, Phil), ~ 20 participants, own computers, 1 – 1,5 days).

Next WG 1 and 2 meeting – preferably south-east Europe (Bulgaria, Turkey) in late October 2016. Sevgi will research the possibilities in Turkey in October 2016.

Opportunities for collaborative projects, proposals, grants, funding
General action for all ENRAM members: secure funding

several EU funding options are discussed:
-ITN network, in particular a European Training Network (ETN): at most 6 countries
-H2020 calls. Jason: none have appeared recently that are relevant.
-Life
-Individual grants.

Felix mentions three levels of funding that are required:
1) For continuing the network after the end of the COST action
2) For technical IT support and development
3) Biological science