Contribution on support for the LI Cal/Val activities

MTG LI MAG Action-6-9

in cooperation with Nicolau Pineda and Antti Mäkelä

VHF lightning data provision for flash size calculations in middle lattitudes (elipsoid method).

Input data requirements:

- one year complete data volume starting from 2010 onwards;
- region in the center of the local network to ensure a good DE and LA;
- selection of flashes starting in chosen region with a buffer zone, not to cut any flash stating on the edges;
- selection of 300 x 300 km domain in the center of national lightning detection network (the best quality lightning data in Poland) which could be compared with Catalunya;
- ensuring the out-of-the-storm-season (e.g. winter lightning) events in the dataset;

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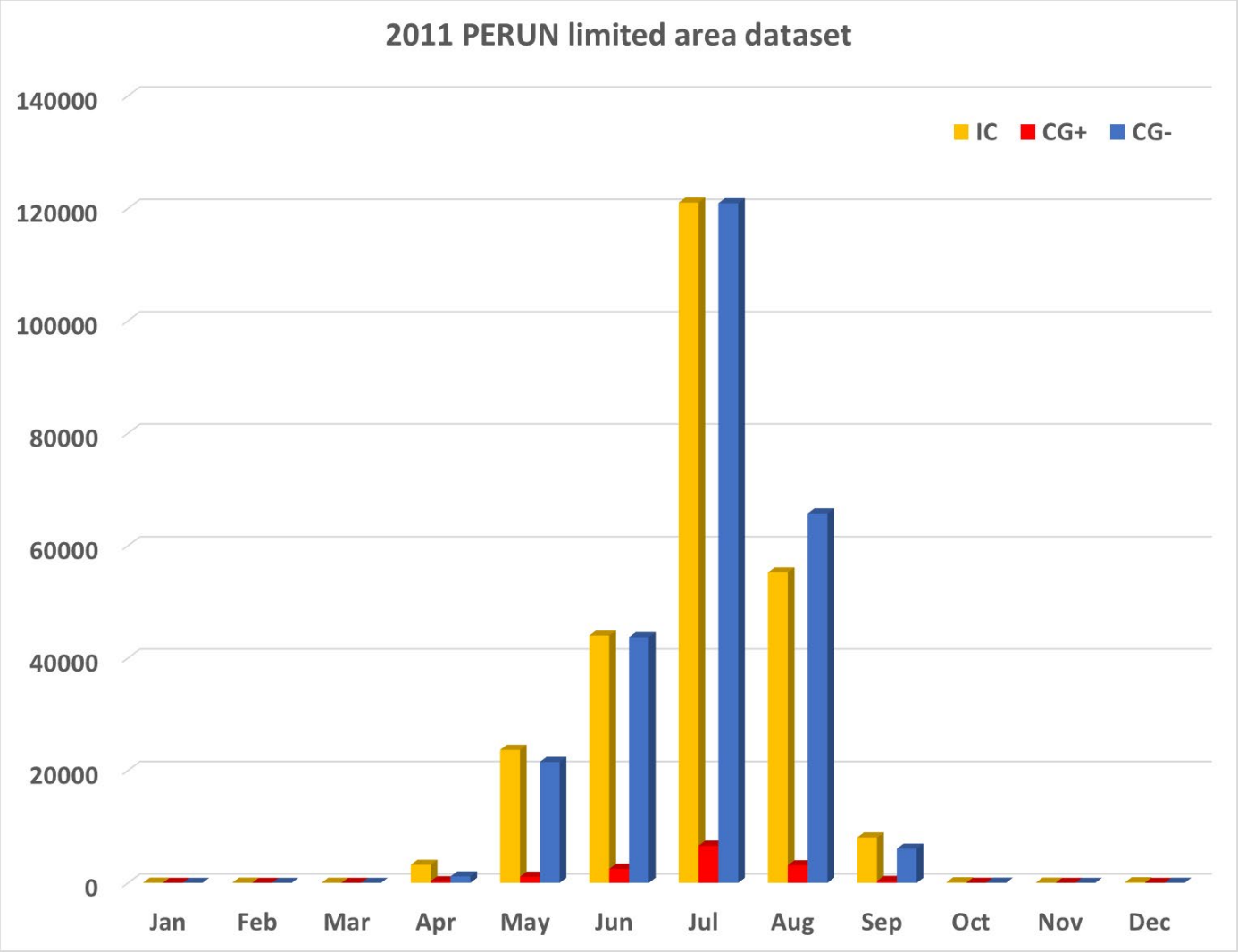
The IMWM-NRI owned PERUN NLDN database filtration results:

Total number of events that matched the given requirements:

IC	255529
CG+	13948
CG-	259108

Total numer of analised records:
2673044



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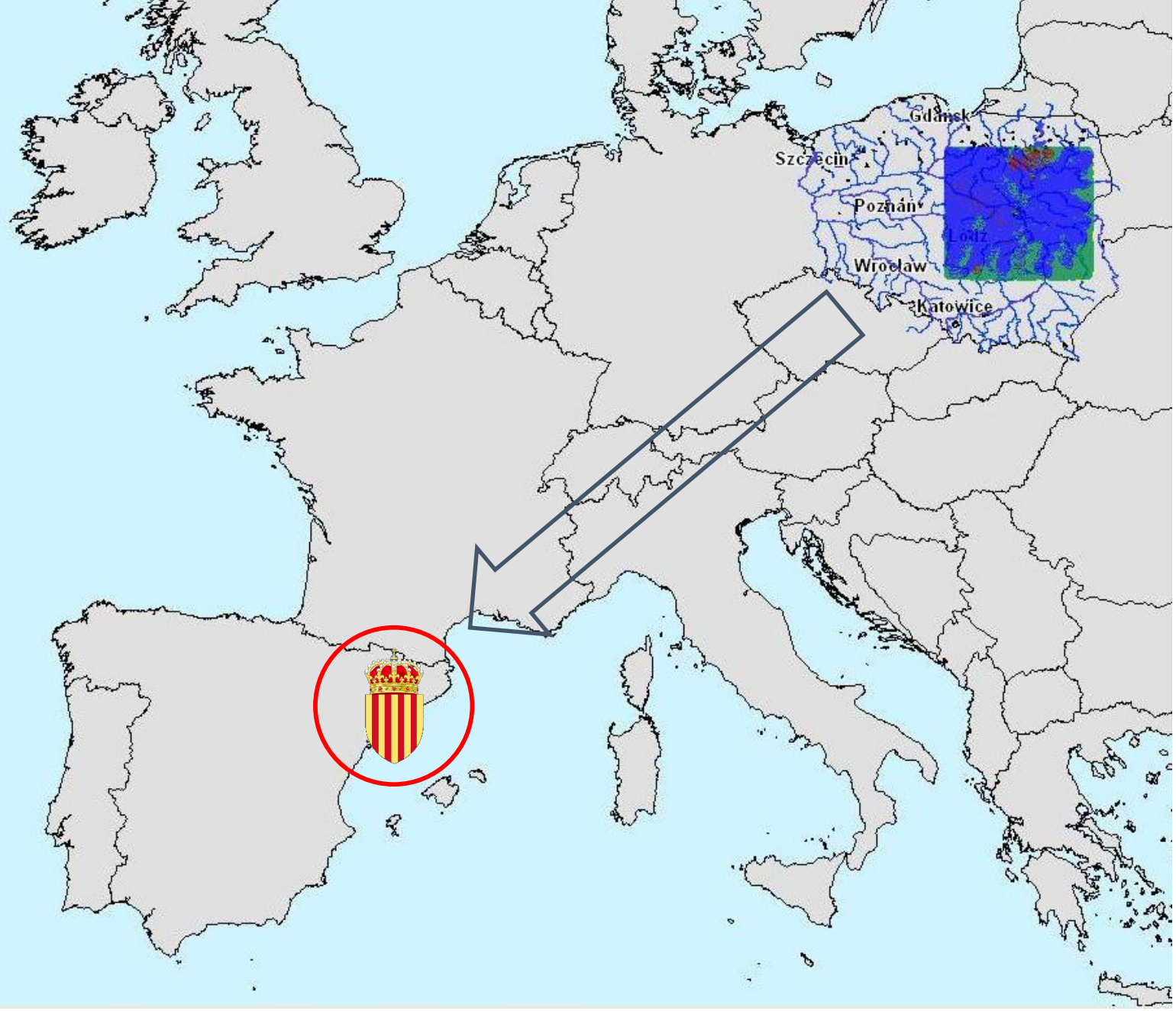

The area mapping comparison

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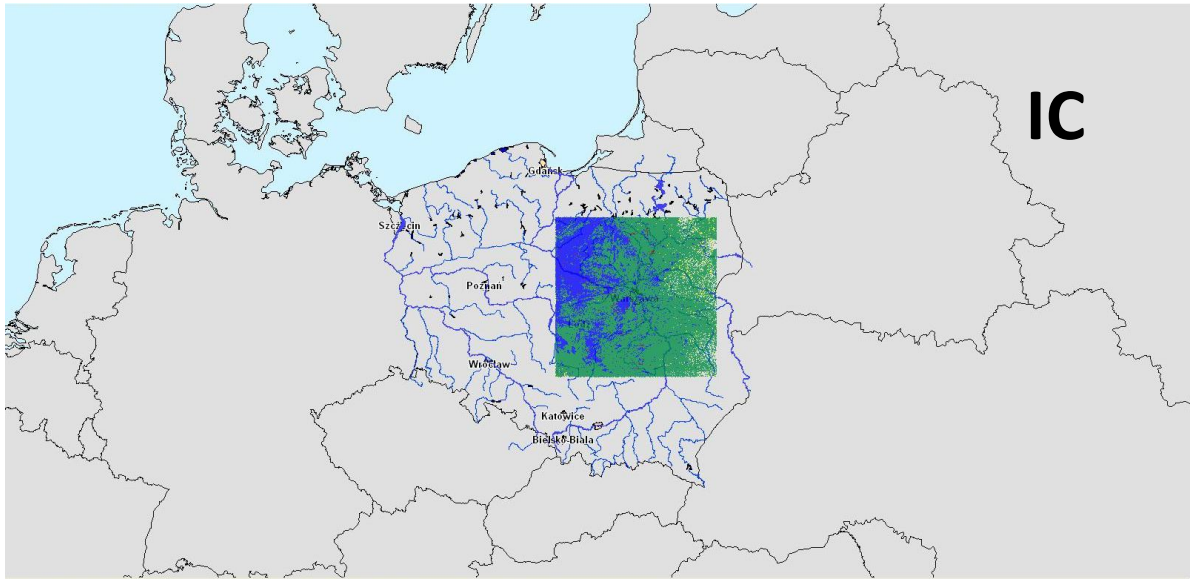
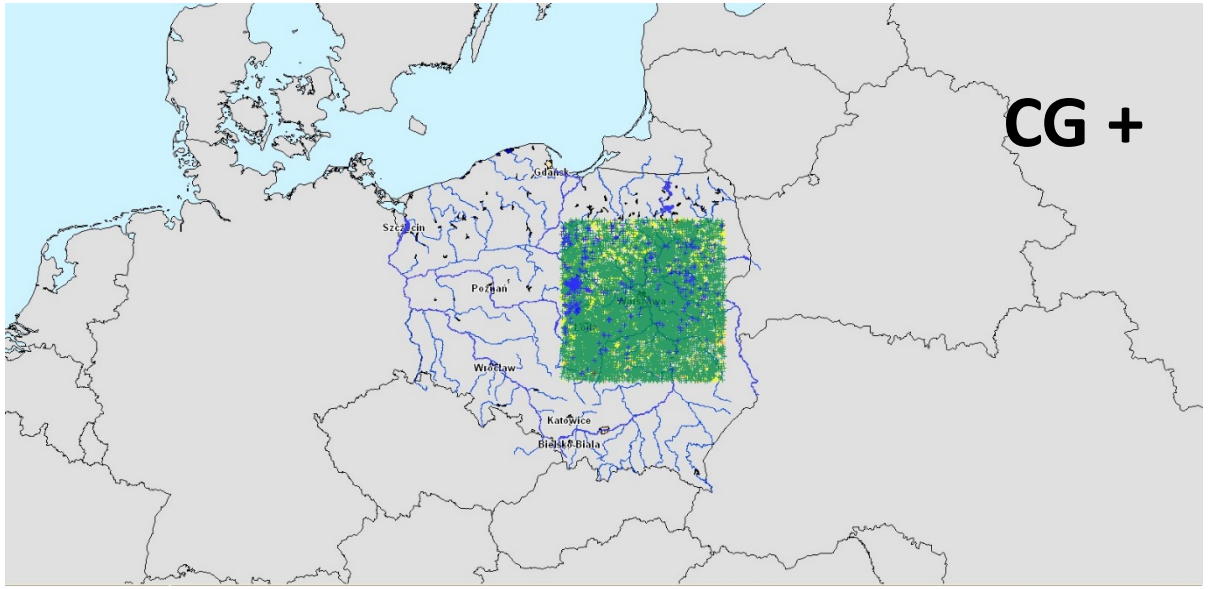
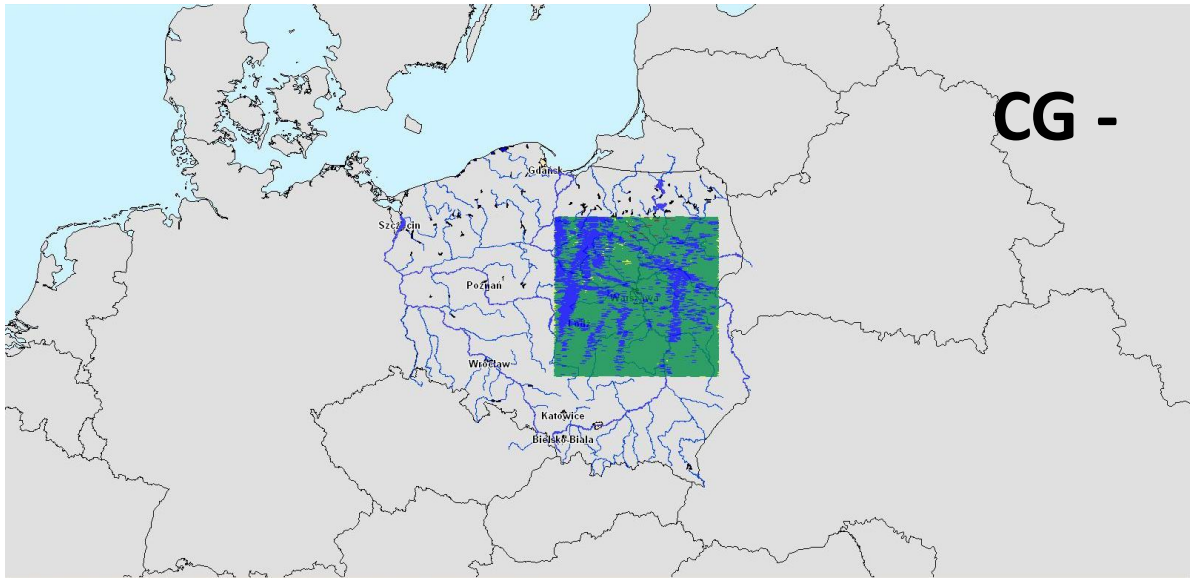
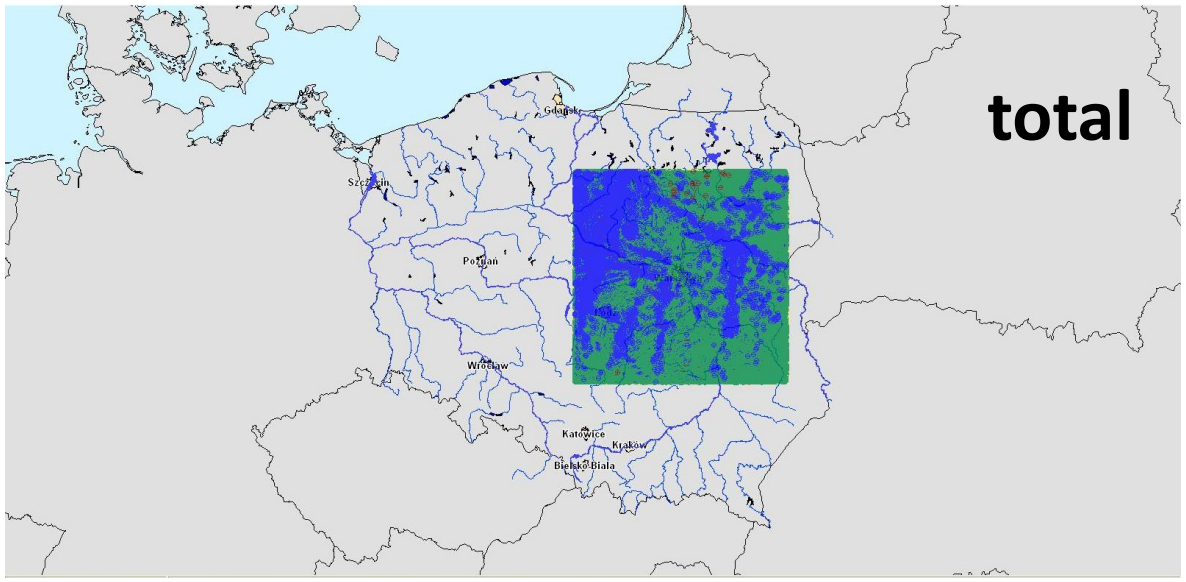
The mapping of 300 x 300 km area by polarity and type









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The calculation of false events in the simulations using the cloud mask literature research results (1)

1. H15A product showing instantaneous precipitation areas using MSG SEVIRI IR imagery calibrated on lookup tables from MW on sun synchronous LEO. The product extracts only the convective precipitation areas from the scene or from storm system presenting the user with limited cloud area of convection (and precipitation) and consequently electrification area.
http://hsaf.meteoam.it/description-pr-obs-6a.php

2. CMA (Cloud Mask) product is generally used to identify the cloud free areas of the scene but on the opposite it shows also the cloud cover itself. It doesn't present the cloud type except of dust and volcanic plumes.
http://www.nwcsaf.org/cma_description

3. CT (Cloud Type) on the other hand gives the information on cloud classes basing on the cloud properties. It also shows the cloud free area over land and sea as well as snow over land. Unfortunately it cannot distinguish between stratiform and convective clouds, yet.
http://www.nwcsaf.org/ct_description

4. RDT-CW (Rapidly Developing Thunderstorms – Convection Warning) product shows the information on the convective clouds. It was designed to consecutively forecast, detect, monitor and track convective clouds. Equipped with some additional parameters is a very useful tool and as such it can be utilised in LI MAG.
http://www.nwcsaf.org/rdt_description

5. CRR (Convective Rainfall Rate) products' objective is to estimate the precipitation rate within convective clouds. Since it is related to convective clouds only it also distinguishes them very effectively using geographically matched and rescaled radar data as input.
http://www.nwcsaf.org/crr_description

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The calculation of false events in the simulations using the cloud mask literature research results (2)

6. Convection RGB (SEVIRI Severe Storms RGB) product designed to monitor convection through analysis of high clouds microphysics. It is a daytime product working well during the storm season at low and mid-latitudes. It focuses on the high clouds only! Sometimes requires some knowledge to be well interpreted.
https://navigator.eumetsat.int/product/EO:EUM:DAT:MSG:CON

7. Optimal Cloud Analysis (OCA) a MSG SEVIRI based dual-layer cloud product focusing on cloud top properties (pressure, optical depth, droplets effective radius [the latter only for the top cloud]). Useful in multi-layer cloud scenes and permitting the overshooting tops detection.
https://cwg.eumetsat.int/optimal-cloud-analysis-oca/

8. The WV-IR Oveshooting Tops imagery (OT), a MSG SEVIRI based product (6,2 µm – 10,8 µm) showing deep convection processes indicating strong convection updraft cases cutting through the tropopause and marking the severe storm conditions areas.
https://www.eumetsat.int/website/home/Data/Training/TrainingLibrary/DAT_2042700.html

9. The Nefodina 10,8 µm product basing on the convective Cb clouds detection and their evolution in the function of time. This is a model supported approach to the strong convection detection, working well in the Mediterranean region (and calibrated for that region). The product shows not only the Cb nucleus but also the whole Cb area where convection is strong and potentially dangerous (electrification region).
http://www.meteoam.it/nefodina/en

10. The IR 10,8 µm enchanced product with M. Setvak palette. The classic IR product enchanced by adding a colourful palette to show the cloud top features (cold V, cold U, cold ring e.g.) of strong convective clouds in full stage of development. You may also look at the so called Sandwich product also with Setvak palette – solar channel (VIS) + IR colour enchanced brightness temperature field superimposed onto one another.
http://www.eumetrain.org/data/5/507/navmenu.php?tab=5&page=1.0.0