GNSS and GNSS-meteorology situation in Lithuania

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LitPOS

- LitPOS is a part of EUPOS for territory of Lithuania. The network owner is the National Land Service under the Ministry of Agriculture
- In operation since 2007
- Receives and processes NAVSTAR and GLONASS signals
- The network consists of evenly distributed 26 GPS stations (Trimble NetRS and Trimble 5700 receivers)
- Information about ionosphere and troposphere conditions will be available in a few months when new software (with Trimble Atmosphere App) will be installed

Leica SmartNet LT

- It is a private network of GNSS stations in the territory of Lithuania, which belongs to SmartNet Europe GNSS
- In operation since 2006
- Receives and processes NAVSTAR and GLONASS signals
- The network consists of 16 evenly distributed GPS stations (Leica GRX1200GG Pro receivers)

Our plans within COST1206

Motivation:

MCS - Mesoscale convective systems (squall and instability lines, clusters of the non frontal convective cells, parts of the main fronts with embedded clusters of Cb etc) are still very unpredictable phenomena because of its temporality and locality.

Task 1:

On the sub daily scale the integrated water vapour data (IWV) derived from GNSS signal would be very useful for diagnosis of MCS and its potential for precipitation, storminess and other phenomena (intensity of hail, thunderstorm etc).

Task 2:

On daily, monthly and seasonal scale the IWV will serve as an alternative source for water vapour climatology (validation of IWV based on comparison with different reanalyses and remote sensed data such as CM-SAF) and air mass analysis.

Our experience related with the task 1:

We almost completed the database of events related to the intensive MCS for Lithuanian territory

The database includes:

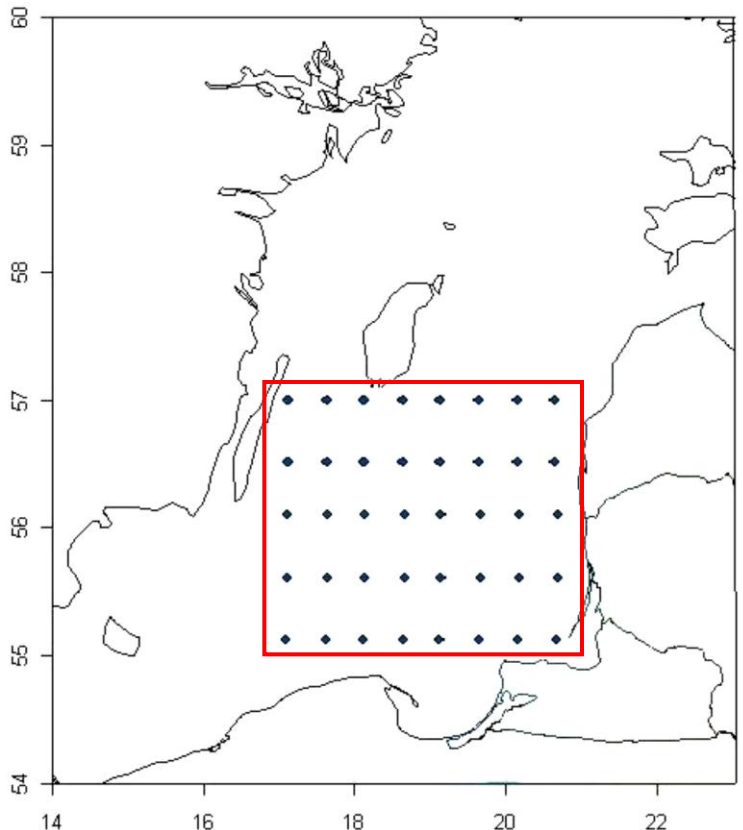
- available sounding data and derived instability indices
- fields of the near surface and upper meteorological variables
    a) derived from *in situ* observations
    b) derived from different reanalyses (MERRA, ERA-Interim)
- analysis of the hindcasts of the phenomena related to MCS
- synoptic and composite analysis of the development of MCS

Our experience related with the task 2: CM-SAF HTW data (1) - vertically integrated water vapour of the atmospheric column

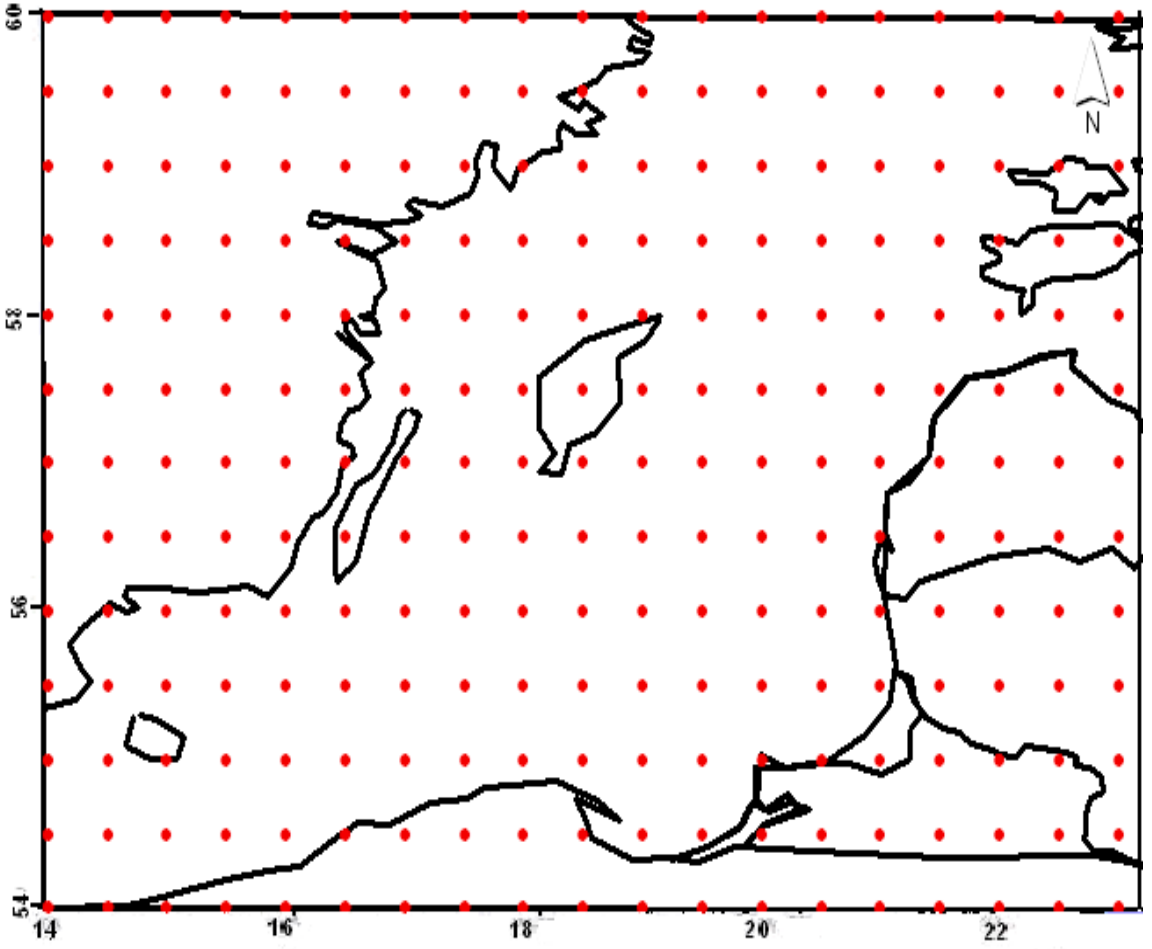
(from the surface to 100 hPa)

HTW derived from:

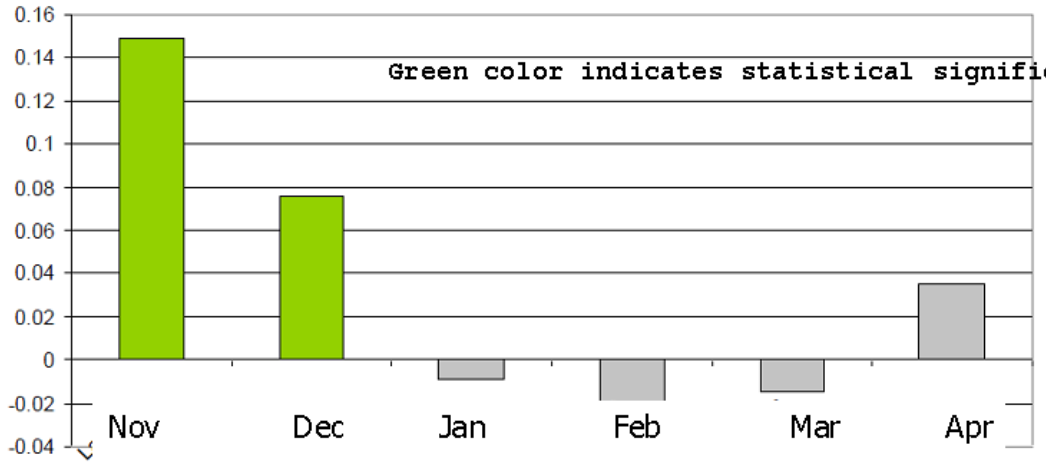
SSM/I (CM-SAF dataset)
1989-2005

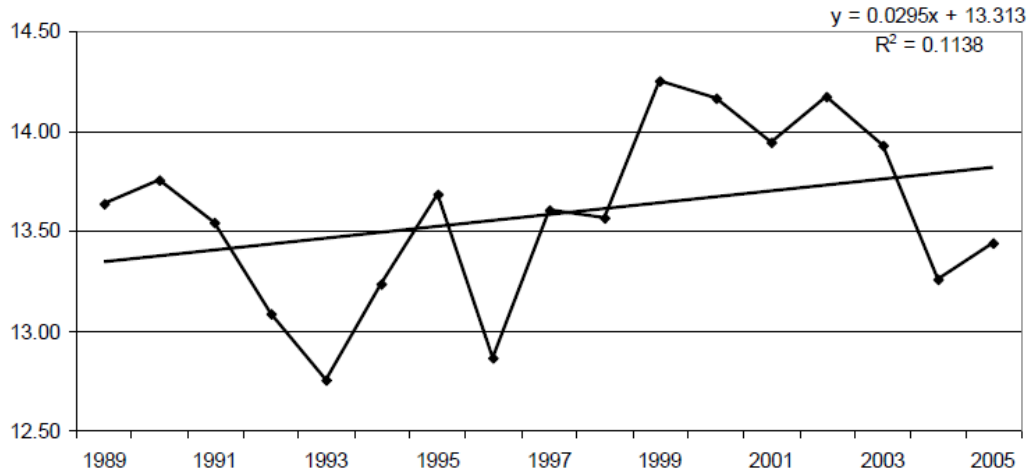


ATOVS (CM-SAF product)
2004-now

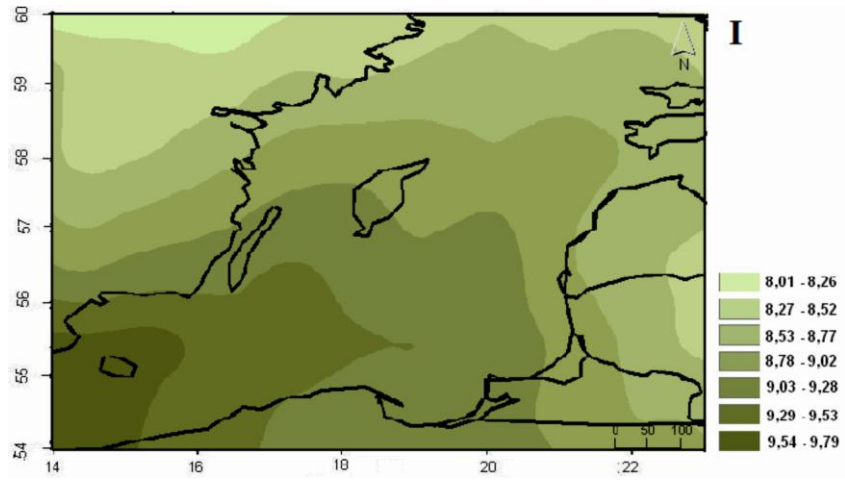


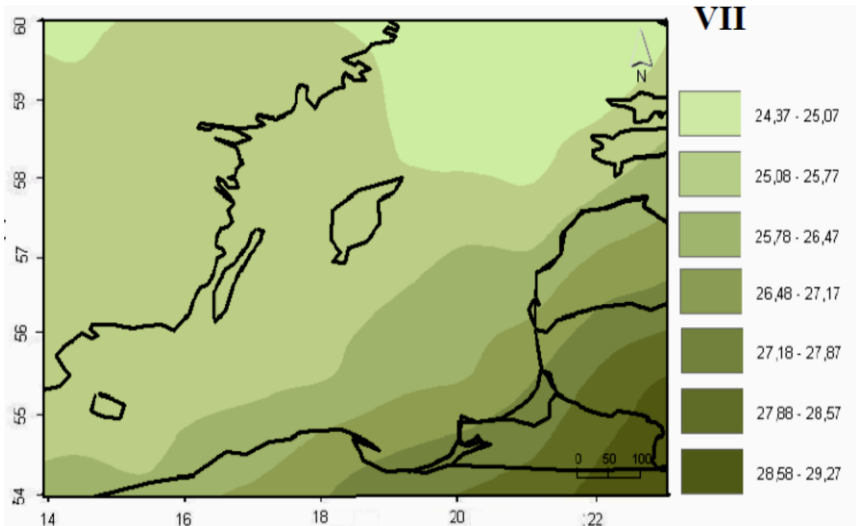
Seasonal and annual trends of HTW over Baltic Proper 1989-2005 (kg/m^2)



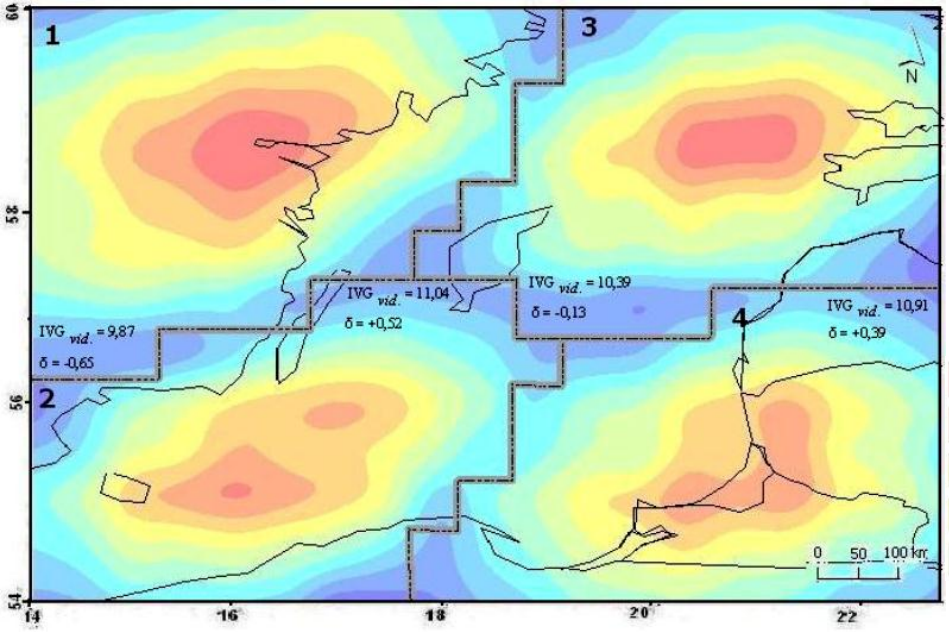


Seasonal mean spatial distribution of HTW 2004-2012 (kg/m^2)



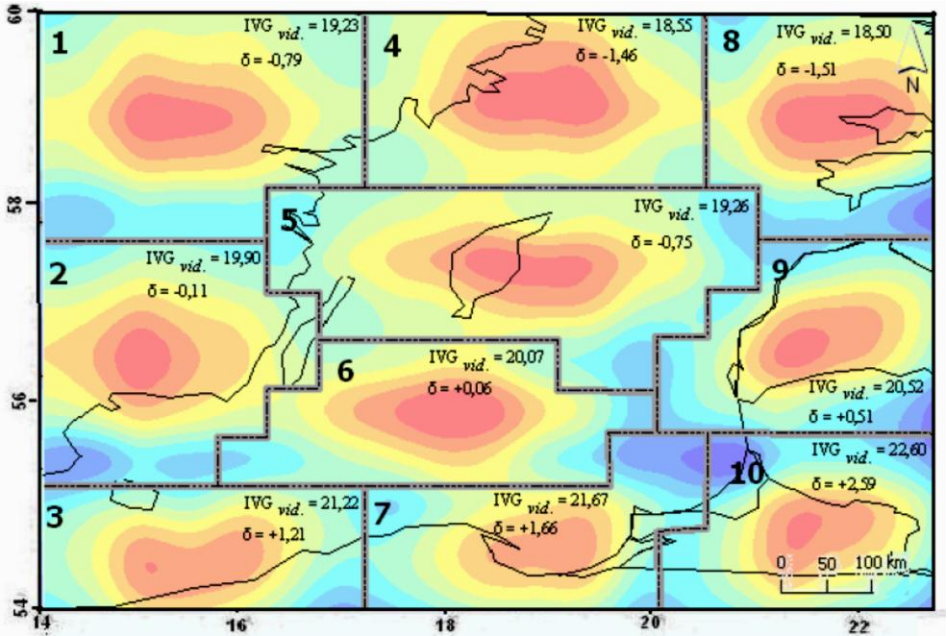


Classification of HTW variability over Southern Baltic



December

0,34 - 0,45	0,91 - 1,02
0,46 - 0,57	1,03 - 1,13
0,58 - 0,68	1,14 - 1,24
0,69 - 0,79	1,25 - 1,35
0,80 - 0,90	1,36 - 1,47



Distances between data and the corresponding cluster centroid

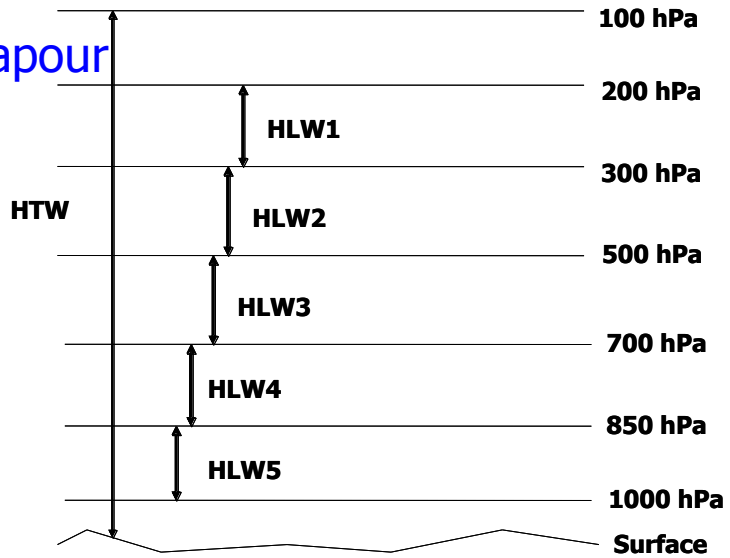
clusters boundaries

June

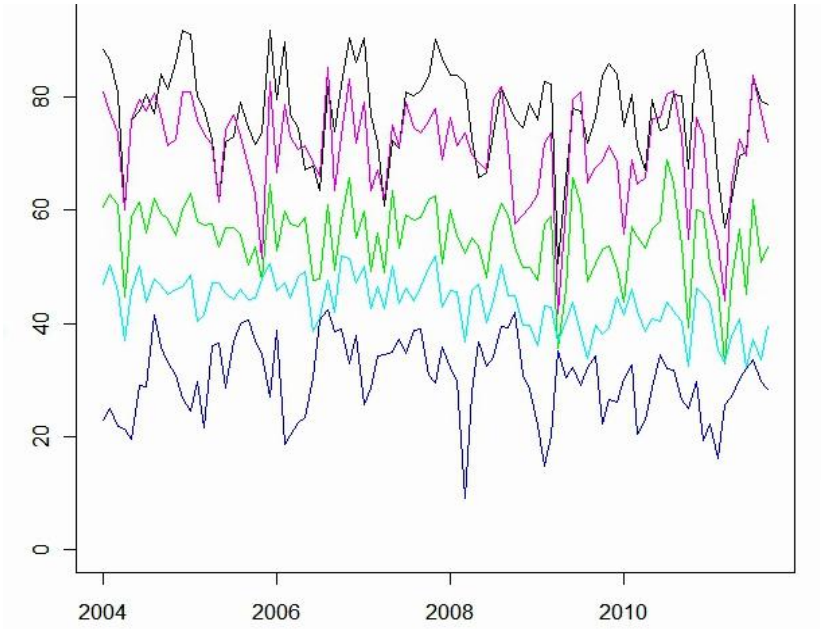
0,49 - 0,68	1,43 - 1,61
0,69 - 0,86	1,62 - 1,80
0,87 - 1,05	1,81 - 1,98
1,06 - 1,24	1,99 - 2,17
1,25 - 1,42	2,17 - 2,36

… and HLW data (2):

a) layered vertically integrated water vapour
b) layered mean temperature
c) layered relative humidity



Monthly mean of HLW mean relative humidity(%) in the different layers



Monthly mean of HLW temperature

HLW5 (1000-850 hPa) **HLW2 (500-300 hPa)**