Status of PP AWARE tasks 1

A.Bundel and RHM colleagues

COSMO PP AWARE online meeting
14.05.2020

Task 1.1 Overview of CW/HIW observational data sources characteristics

RHM, subtask 1.1.2.

FTE 0.05

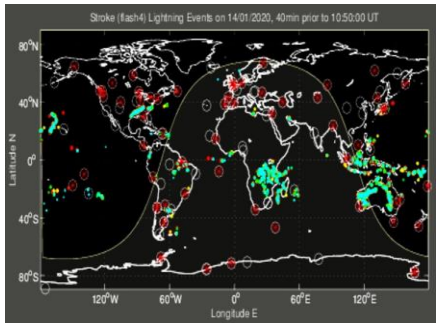
Deliverables: Report on available observational data sources for thunderstorms and lightning detection network, accuracy estimates based on selected test cases.

Start 10.2019 – End 02.2020

Ongoing, but slightly delayed.

RHM subtask 1.1.2
Thunderstorms observation data

- Data of SYNOP stations: visual thunderstorm occurrence at a given obs time and between obs times in a radius 5 km
- Gloabal Network maps: http://wwlln.net/TOGA_network_global_maps.htm
  Lightning stroke positions are shown as coloured dots which "cool down" from **blue for the most recent** (occurring within the last 10 min) through **green** and **yellow** to **red for the oldest** (30-40 minutes earlier). Red asterisks in white circles are active WWLL lightning sensor locations Very Low Frequency sensors



Subtask 1.1.2. Cont.

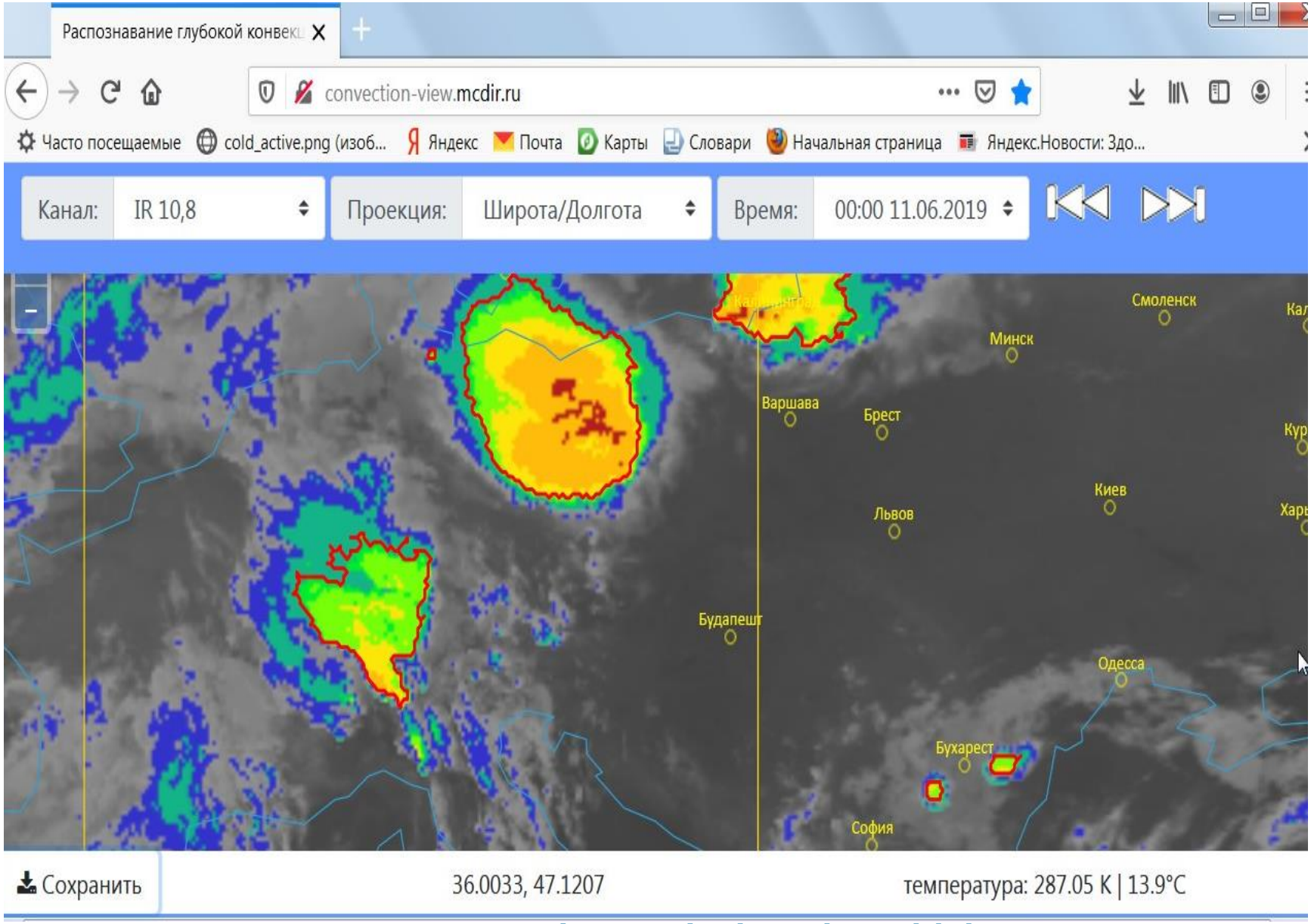
- Regional lightning detection networks: sensors in the real time within 100-300 km radius, also Very Low Frequency, two types of lightnings: cloud-earth and in the clouds.
  In Russia, it is the lightning detection system of Roshydromet ALVES 9.07 (*Gubenko I., PhD thesis, 2016, A study of the physical processes in convective clouds during thunderstorms based on numerical simulation; Снегуров А.В., Снегуров В.С., 2012*).
- Meteorological radar data
- Meteorological satellite data. In the areas of recognized Cb clouds, a function is calculated to diagnose the intensity of convective events (*Алексеева А.А., Бухаров М.В. и др., 20*06).

In *Gubenko I., PhD thesis, 2016, A study the physical processes in convective clouds during thunderstorms based on numerical simulation (In Russian),* **a comparison of the accuracy of LDN is given**

Subtask 1.1.2. Cont.

A study on identification of the areas of deep convection based on satellite data: *Irina Gorlach and A. Shishov, RHM*

- Based on calibrated radiative temperature from **Seviri, Meteosat-11**, using a threshold, a mask of deep convection areas is found. Then the cell shape is determined. The cells are traced in time based on the normalized overlapping area. Cell destroying is also taken into account.
- Then, the cell movement direction, deformation, and other characteristics are identified.
- It is planned to involve other data for deep convection area identification, such as surface obs (KH01, METAR) and COSMO-Ru / ICON-Ru prognostic fields
- **We propose an extension of RHM subtask 1.1.2 to include this study with additional 0.1 FTE**



Irina Gorlach and A. Shishov, RHM

Classification of Deep Convection cells for recognizing from satellite Meteosat-11

Classes	Duration	Linear Dim. (Km/pixels)	Area (Km^2/pixels)
Single Cell	30-50 min.	5-10 / 1-2	20-80 / 1-3
Multicell Thunderstorm Squall line	2-6 hours	20-30 / 3-5	310-700 / 8-20
Supercell	1-6 hours	20-30 / 3-5	310-700 / 8-20
Mesoscale convective system	6-12 hours	350-500 / 60-80	100.000-200.000/ 2800 - 5500

An Italian tool for convection: Nefodina. Davide Melfi. 2011.
Italian AF-Meteorological Service, CNMCA 2011, EumeTrain. Session 4 of Convection Week 2011, 6-9 June 2011