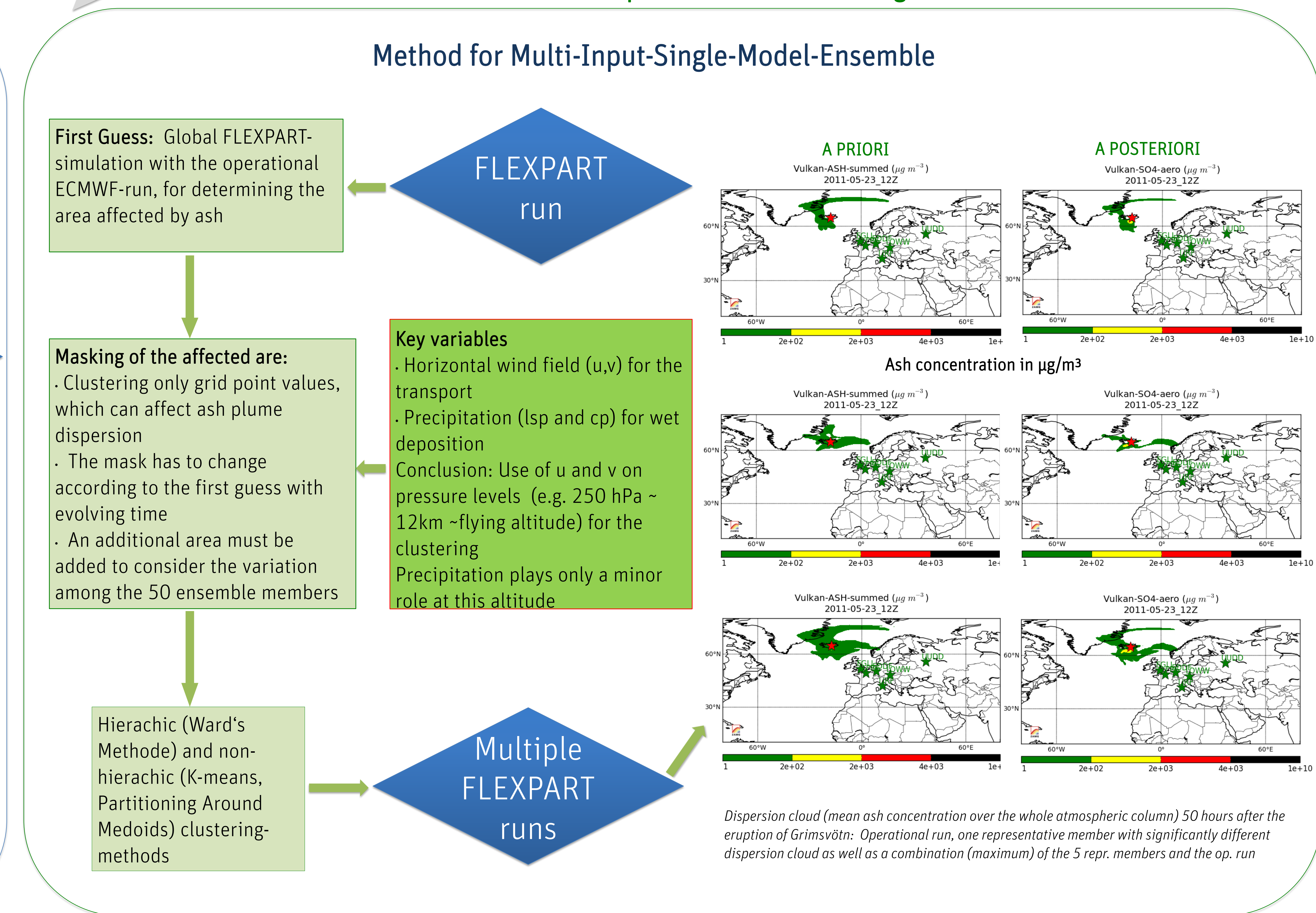
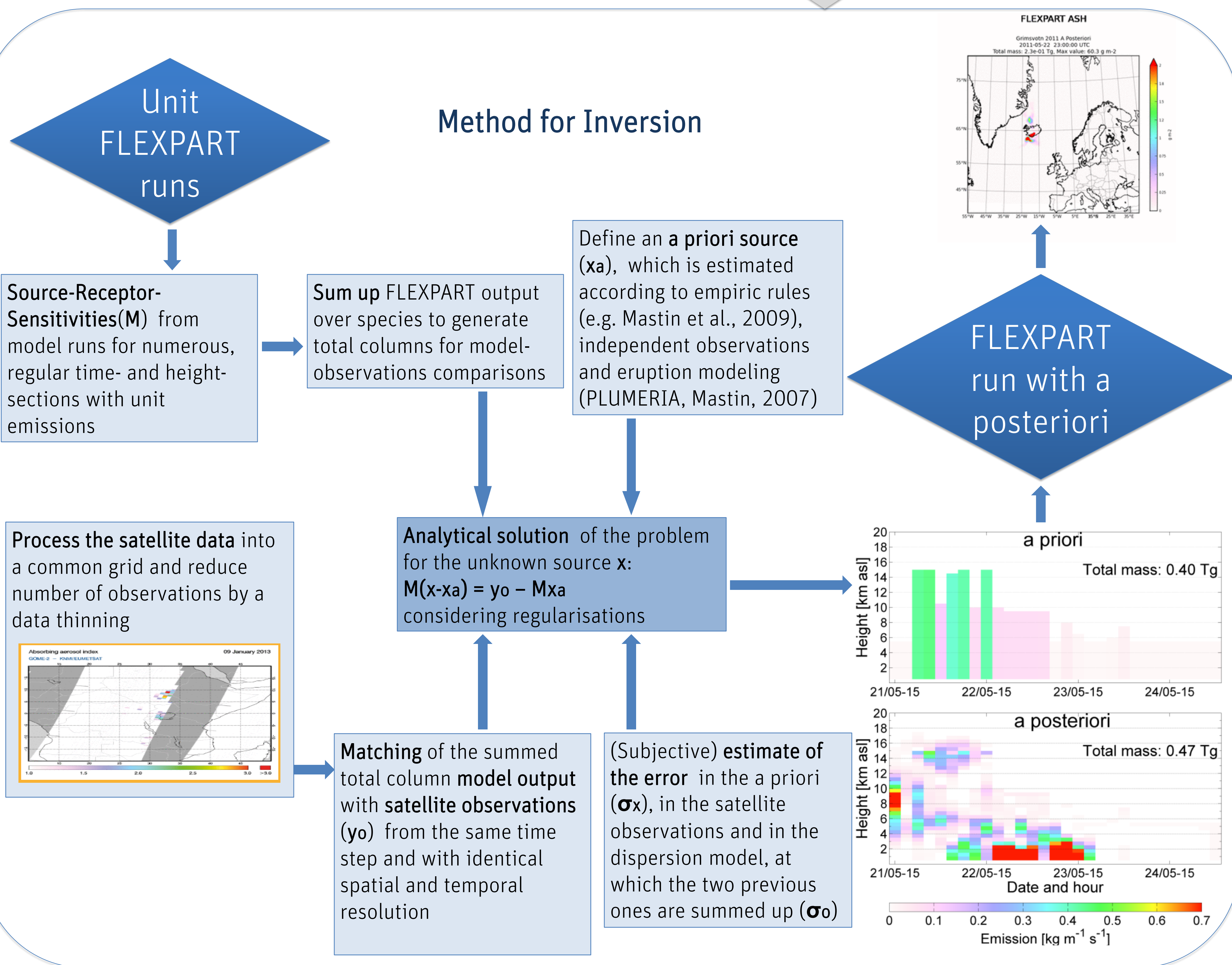
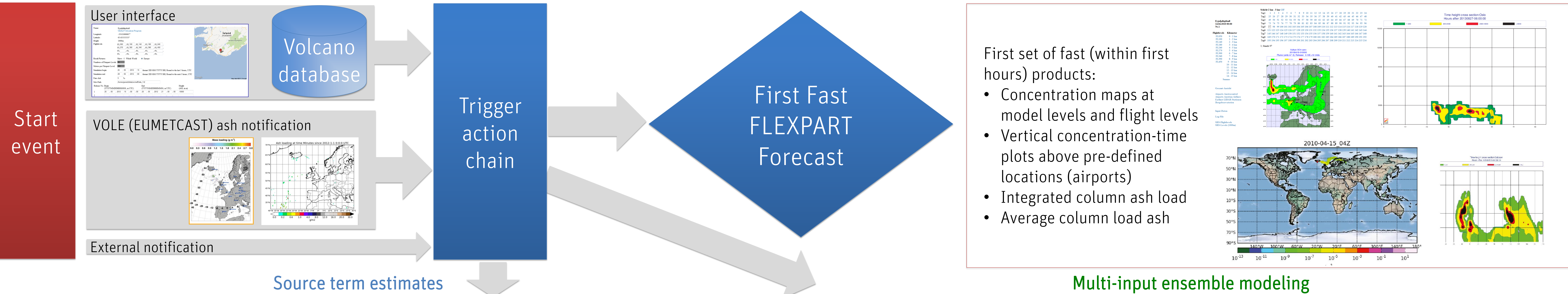


The main objective of the ESA-funded project VAST is to enhance the use of Earth Observation (EO) data in volcanic ash monitoring and forecasting for civil aviation. The project aims at further exploring the suitability of EO data to identify ash in the upper airspace, and to improve volcanic ash forecasts based on atmospheric models by a seamless integration of inverse modeling and ensemble prediction approaches. While some of the methods applied are already well-established and considered as state-of-the-art in the scientific domain, it still remains to be proven whether they can be applied in an operational environment within the characteristic time/resources constraints. The demonstration system consists of a tool to start operational model simulations connected with a volcano database, a module to take into account the meteorological forecast spread (ensemble prediction system), a module to consider the spread between different prediction systems (atmospheric transport models from different institutions), and last but not least a volcanic ash emission estimator based on inverse modeling fed with EO data. After the end of the VAST project, the validated demonstration system will be available to VAACs and other users, and is also considered for operational implementation at ZAMG for national purposes.



2nd EXERCISE – 2013.10.22./23. FURNAS ERUPTION

Motivation:

- Test our group capabilities, reaction and products available at different stages of the project.
- Develop multi-input / multi-model ensemble tools
- Develop common tools to process multi-model data
- Improve our reaction time and timely generation of various outputs

Test case:

- Furnas volcano (high chances of affected European airspace)
- 24 hour release
- Constant release rate
- Fine ash & multi-species simulations
- Common outgrid /times

Methodology

- Email notification with details of the event and runs to be done
- 2/day (or more) videoconferences with VAST partners
- Each group performs independent runs
- ZAMG performs, in addition, the multi-input runs with ECMWF ENS members
- Transfer and processing of model runs
- Reporting and definition of actions based on learned experiences

E-mail
 VAST exercise notification - EVENT - 2013/10/22 - Furnas

VAST EXERCISE NOTIFICATION
 Request date : 2013/10/22
 Request time : 09:15 UTC
 Exercise number : 002
 ZAMG contact: xxx.xxx@xxx.xxx

INST : ZAMG
 server : ftp.www.xxx.xx.xx
 username : xxxx
 Password : xxxx

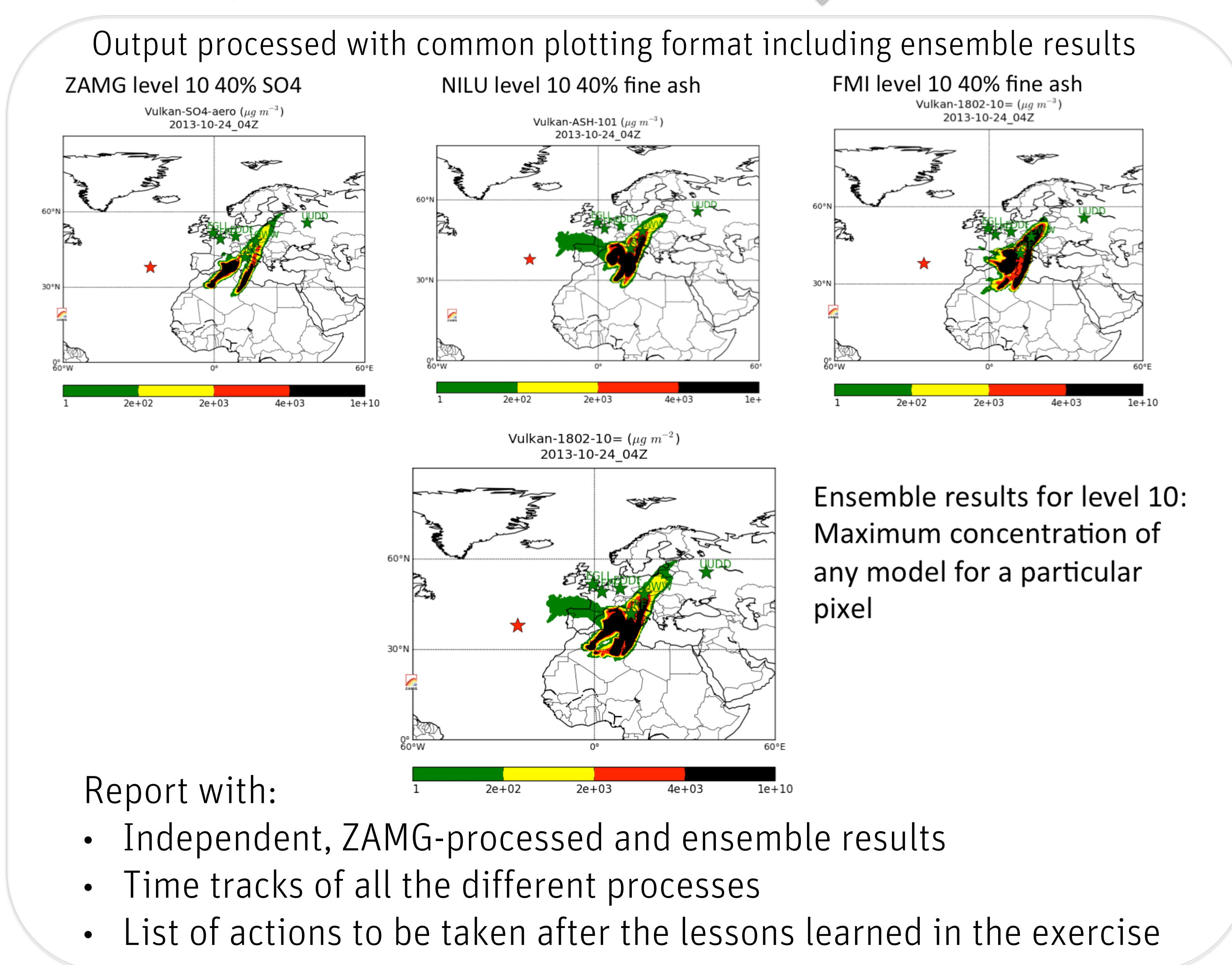
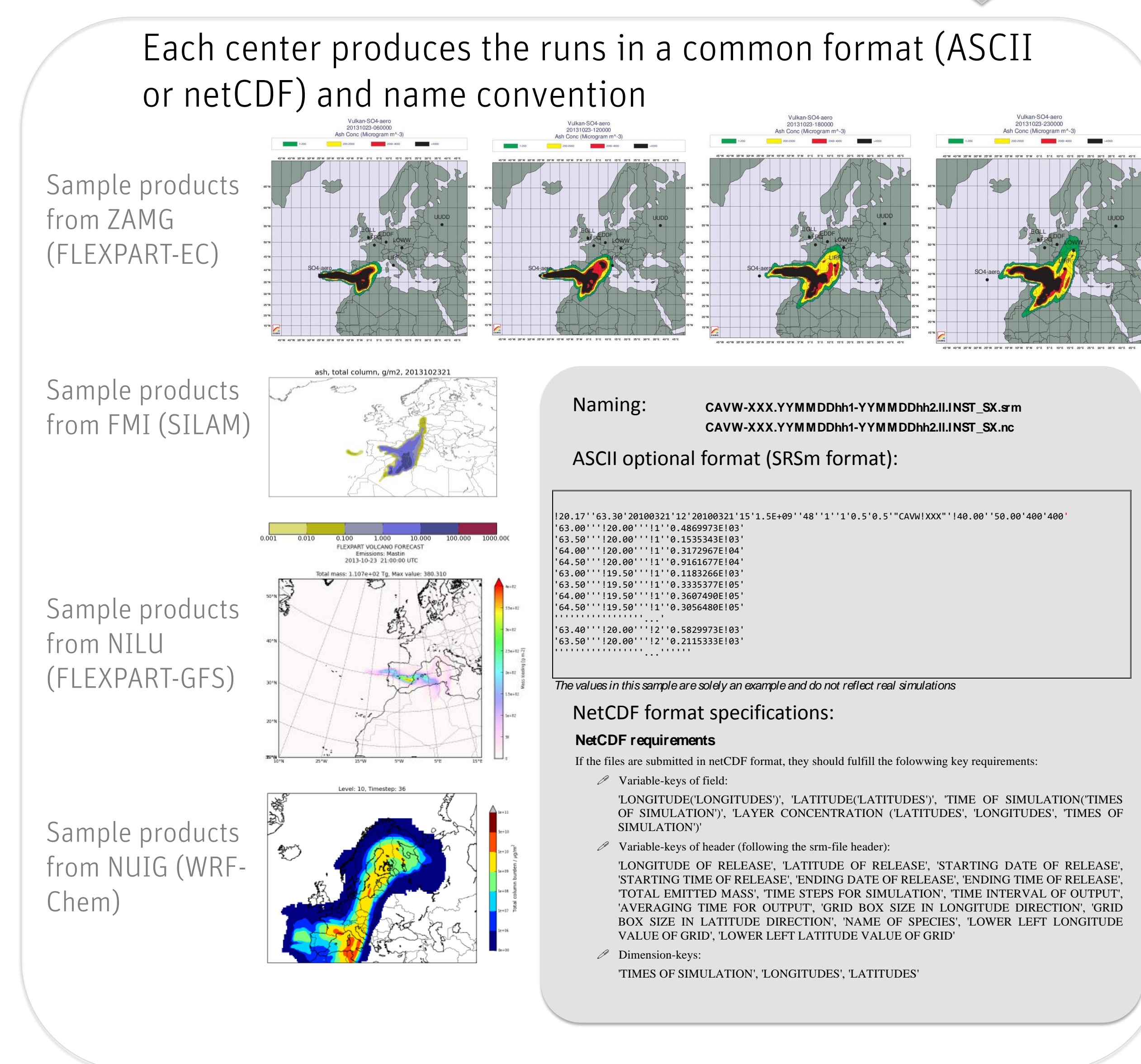
Longitude (deg) : -25.320
 Latitude (deg) : 37.770
 Vent Height (m) : 805
 Erup Start(UTC) : 2013102209
 Erup End (UTC) : 2013102212
 Height(m) : 12000
 Fine ash frac. : 0.4
 Sim. Length(Hr) : 48
 CAW-XXX : 1802-10=

Meteorological Bulletin
 VOLCEX13/02 EXERCISE FROM 22./23. OCTOBER 2013

Meteorological bulletin from ZAMG
 published 23.October 2013, 12:00 MESZ
 Author: Mag. Andreas Frank, Synoptic Meteorology/Division Customer Service

On October 22nd the Volcano Furnas located at the Azores had an eruption. The ash cloud from this eruption reaches today in the afternoon the western parts of Austria. The reason for this fast transport to middle Europe is a strong southwesterly flow, which had established a few days ago on the front side of a well pronounced trough located from island over the British Islands to Portugal. [...]

Further development:
 The southwesterly flow, with Föhn north of the Alps, persists in the next days. So dry and warm weather conditions are expected in Austria, in the eastern and southeastern parts low stratus can be established. Austria is most of the time direct in the flow of the ash cloud. [...]



Conclusions

- The operational part of VAST has already a first version in place
- Multi-input ensemble modeling performed in-house (by hand)
- Multi-model ensemble modeling feasible in reasonable times
- Systems tested and problems and improvements identified
- Reaction times and procedures match the time needs of a real event

Outlook

- Implement ensemble modeling into the automatized system
- Introduce the SO2 modeling in the system including the detailed source term estimates
- Introduce the inversion modeling in the operational system