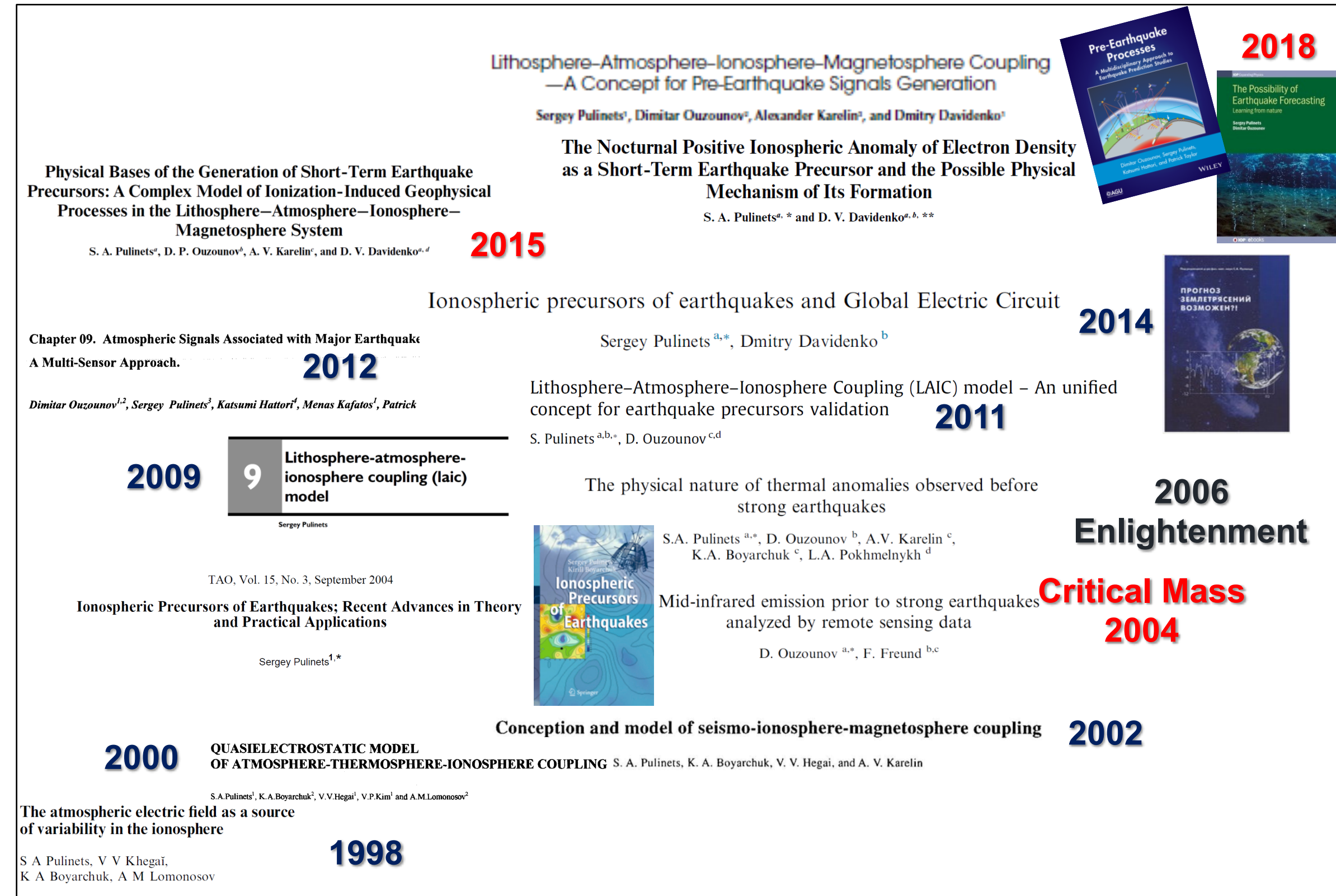


Summary

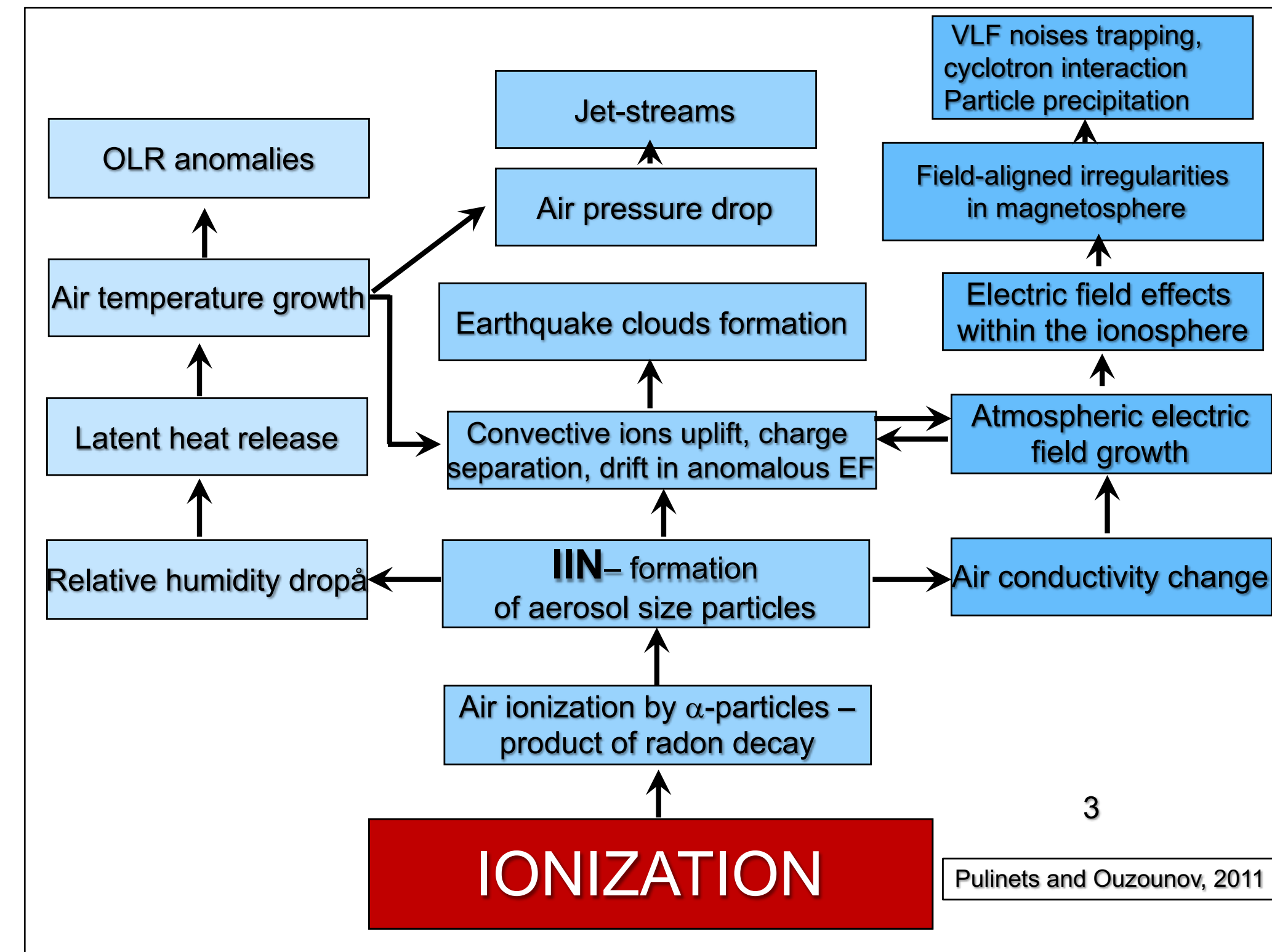
We present approach based on physically substantiated short-term precursor's selection to provide the real-time multiparameter monitoring towards the short-term forecast of earthquakes. Three main principles should be fulfilled: 1. We register natural phenomena for which we have multi-year experience demonstrating their connection with the earthquake preparation processes; 2. All these phenomena have very high statistical confidence in relation to post-phenomena earthquake occurrence; 3. We have the physical explanation of these anomalous phenomena generation and their interrelation within the framework of earthquake preparation processes. It is important to note that short-term precursors related to major earthquake (M>6) are registered in different geospheres (lithosphere, atmosphere, ionosphere and magnetosphere) what confirms the fact of geospheres coupling during the earthquake preparation period. For the first time we included in consideration the role of triggers and their relationship with precursors. One of the well-studied trigger phenomena are the Space weather events changing the global atmospheric circulation. The arising large-scale irregularities of atmospheric pressure may serve as earthquake triggers while their linear borders coincide with the active tectonic fault. Another recently revealed effect is existence of earthquake delays when earthquake occurrence has been delayed (up to months) in comparison with the our time interval. The complex interaction

between triggers and delays driven processes requires additional research and should be included into the procedures of short-term earthquake forecasting framework. All these ideas are presented in the upcoming book "The Possibility of Earthquake Forecasting: Learning from Nature" published by Institute of Physics (IOP)

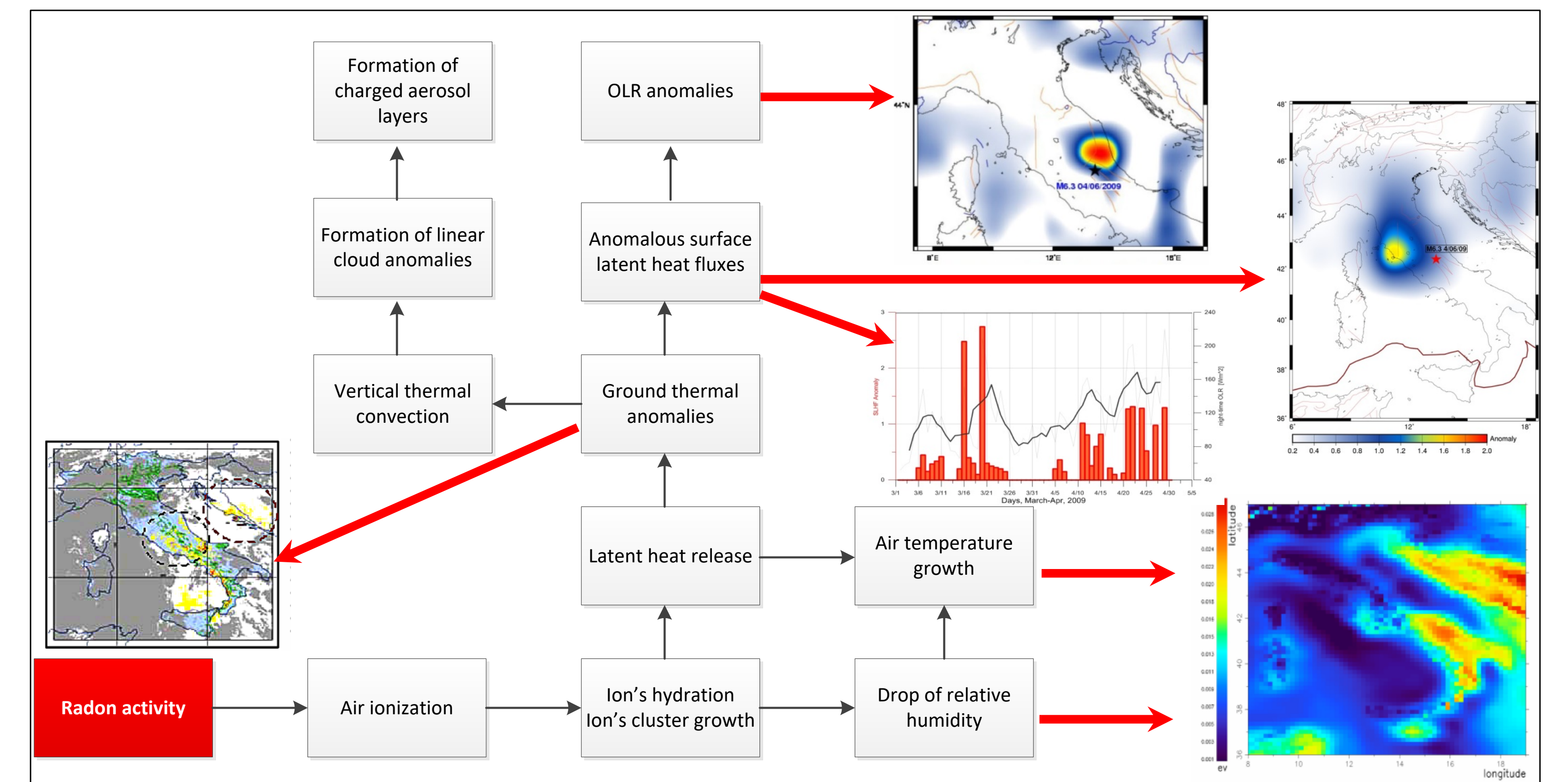
LAIC evolution



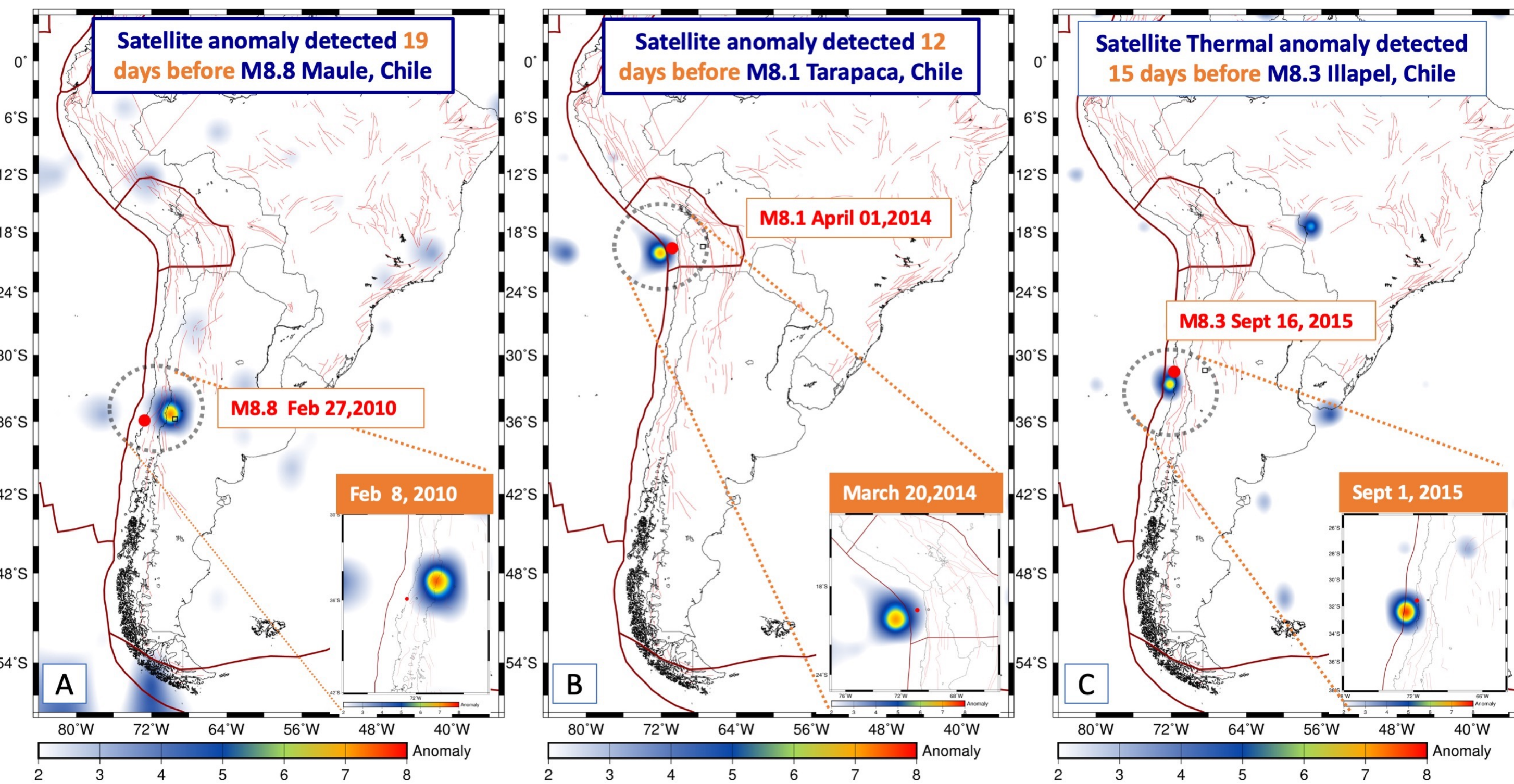
Most recent view of the LAIC conception



LAIC-Plasmachemistry-Thermal interface

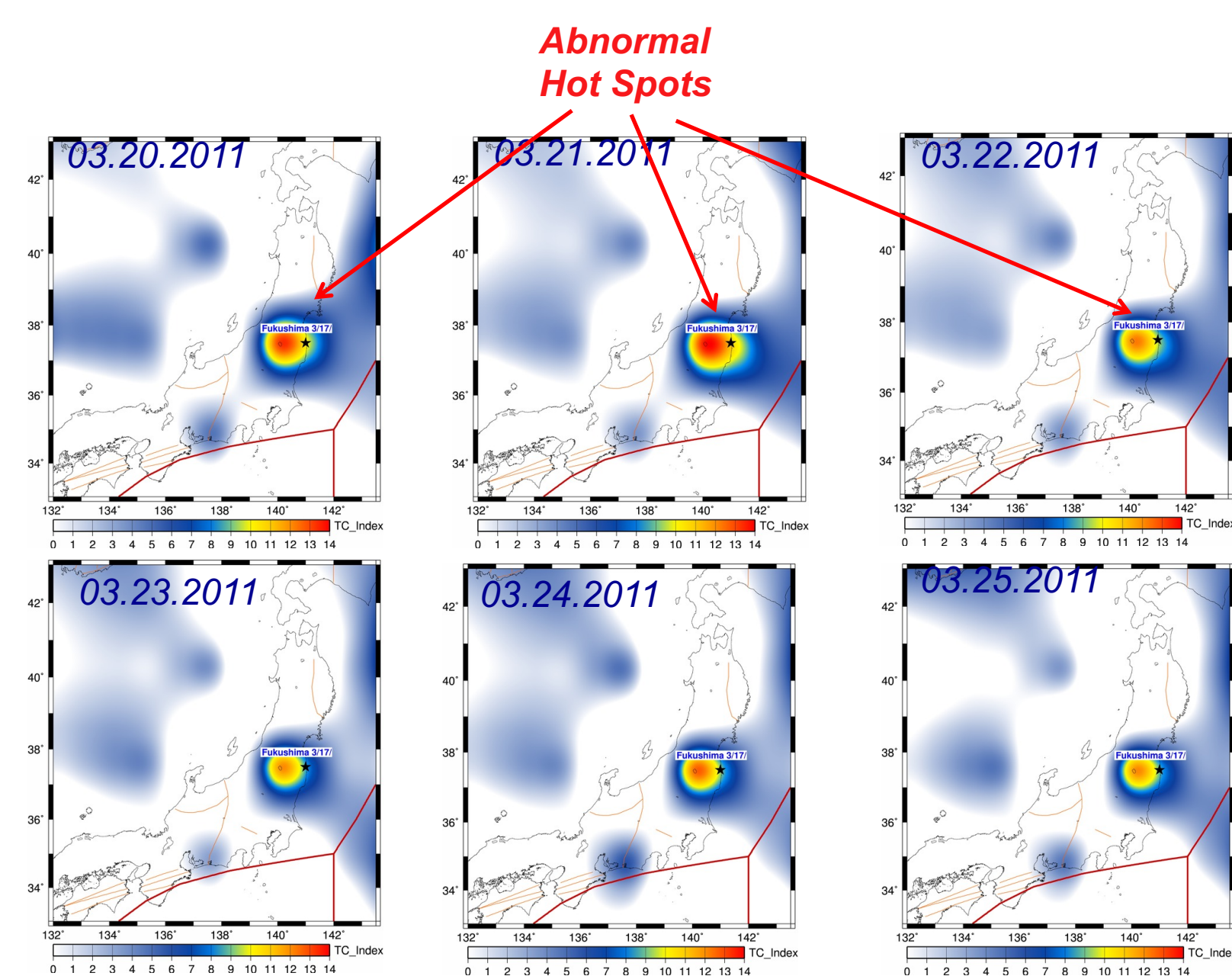


Thermal anomalous signals before the largest seismic events in Chile since 2010



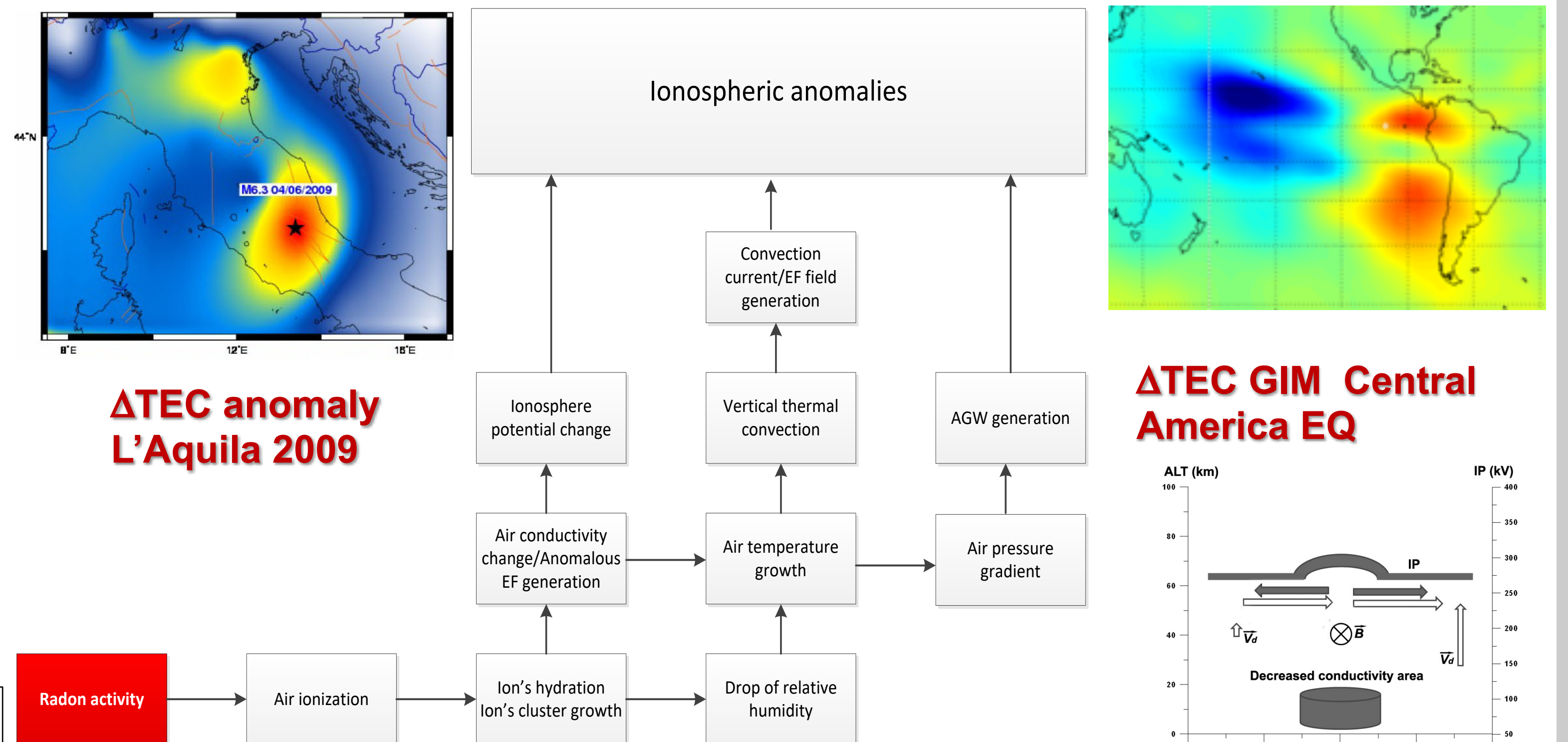
Thermal anomalies maps (OLR) related to latest M8 earthquakes in Chile. (A) M8.8 of February 27, 2010, Maule. Anomalous map of February 8, 2010, 19 days in advance (retrospective analysis). (B) M8.1 of April 1, 2014, Tarapaca. Anomalous map of March 20, 2015, 12 days in advance (retrospective analysis). (C) M8.3 of September 16, 2015, Illapel, 2015, 15 days in advance (prospective analysis). The epicenter is marked with a black star, the tectonic plate boundaries with a red line, and the major faults with brown.

LAIC model validation by technogenic radioactivity



Time series of daytime anomalous OLR observed from NOAA/AVHRR (07.30 LT) time of the equatorial crossing) March 14-March 31, 2011 over Honshu, Japan. Tectonic plate boundaries are indicated with red lines) and major faults by brown. The location of FDNPP is indicated by a black star. The maximum rate of change for OLR been seen over FDNPP.

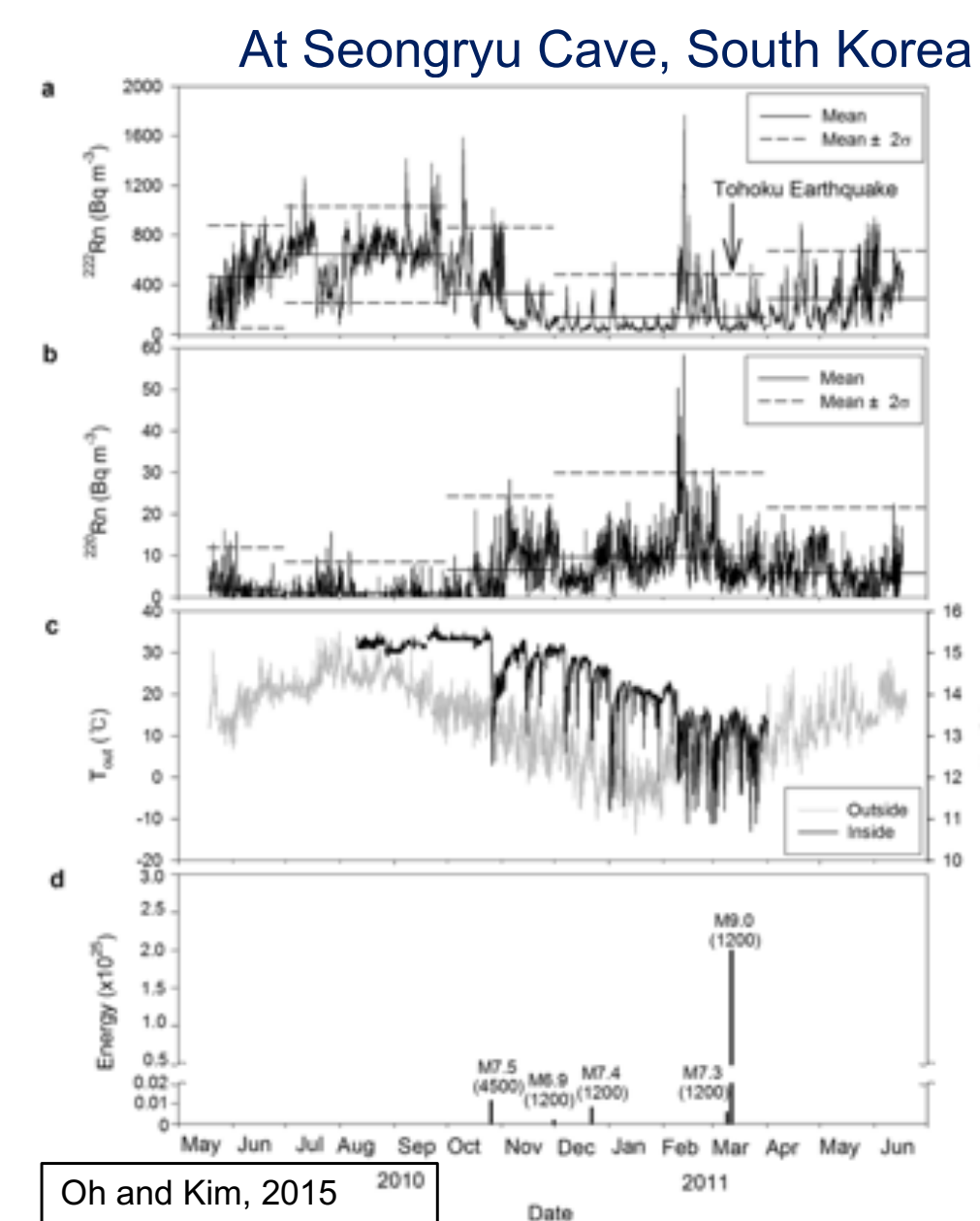
Plasmachemistry-Electromagnetic interface



Radon anomalies before M9.0 Tohoku 2011?

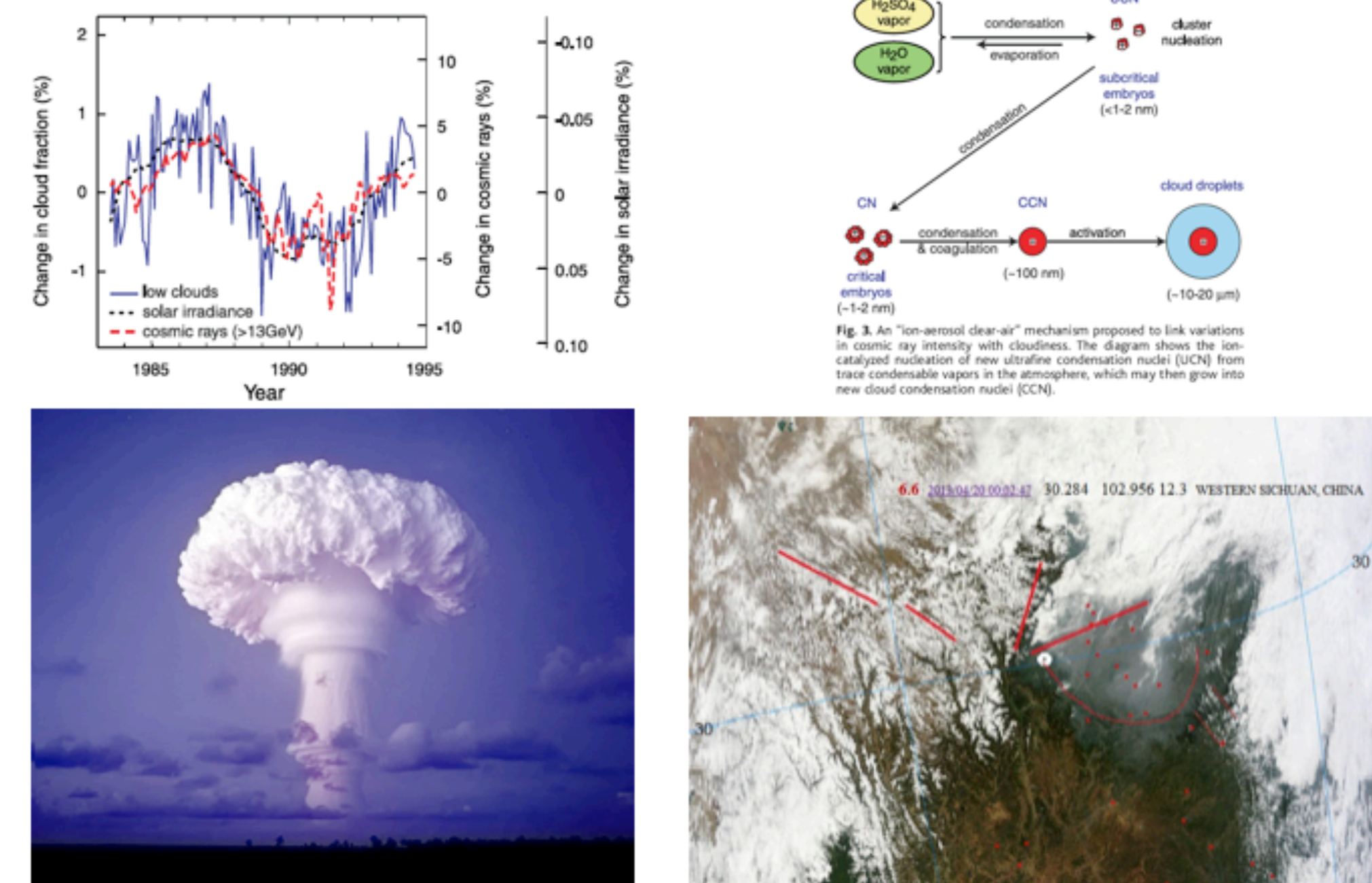


a) Hourly variations in 222Rn activity. (b) Variations in 4-hour averaged 220Rn activity. (c) Variations in air temperature during the monitoring period, both inside and outside the cave. (d) Energy (unit: erg = 10⁻⁷ J) of earthquakes with magnitudes greater than M6.0 in Japan and Malaysia during the monitoring period.

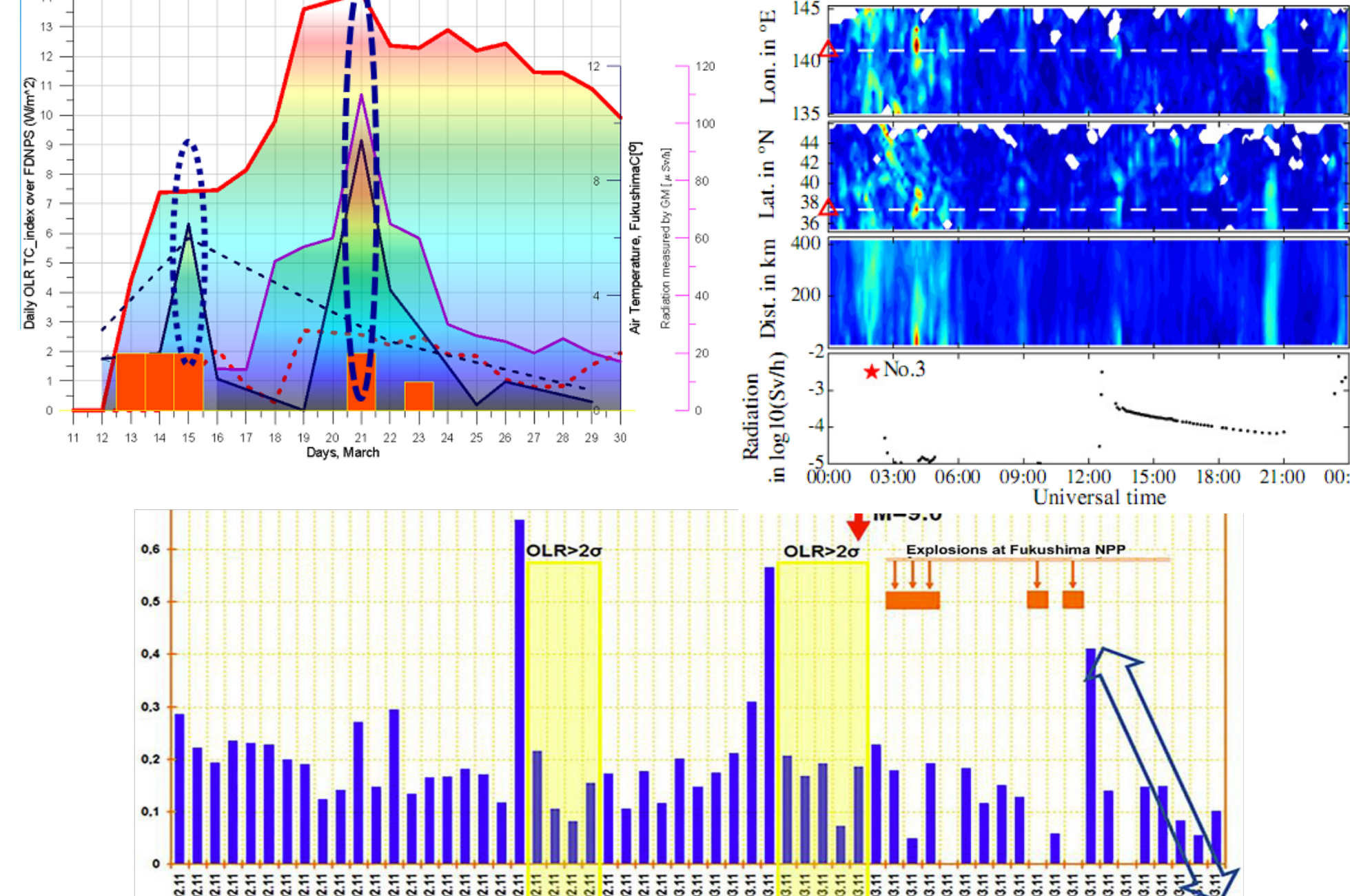


Radon Anomalies started on Feb 15, 2011 24 days prior to the March 11 2011

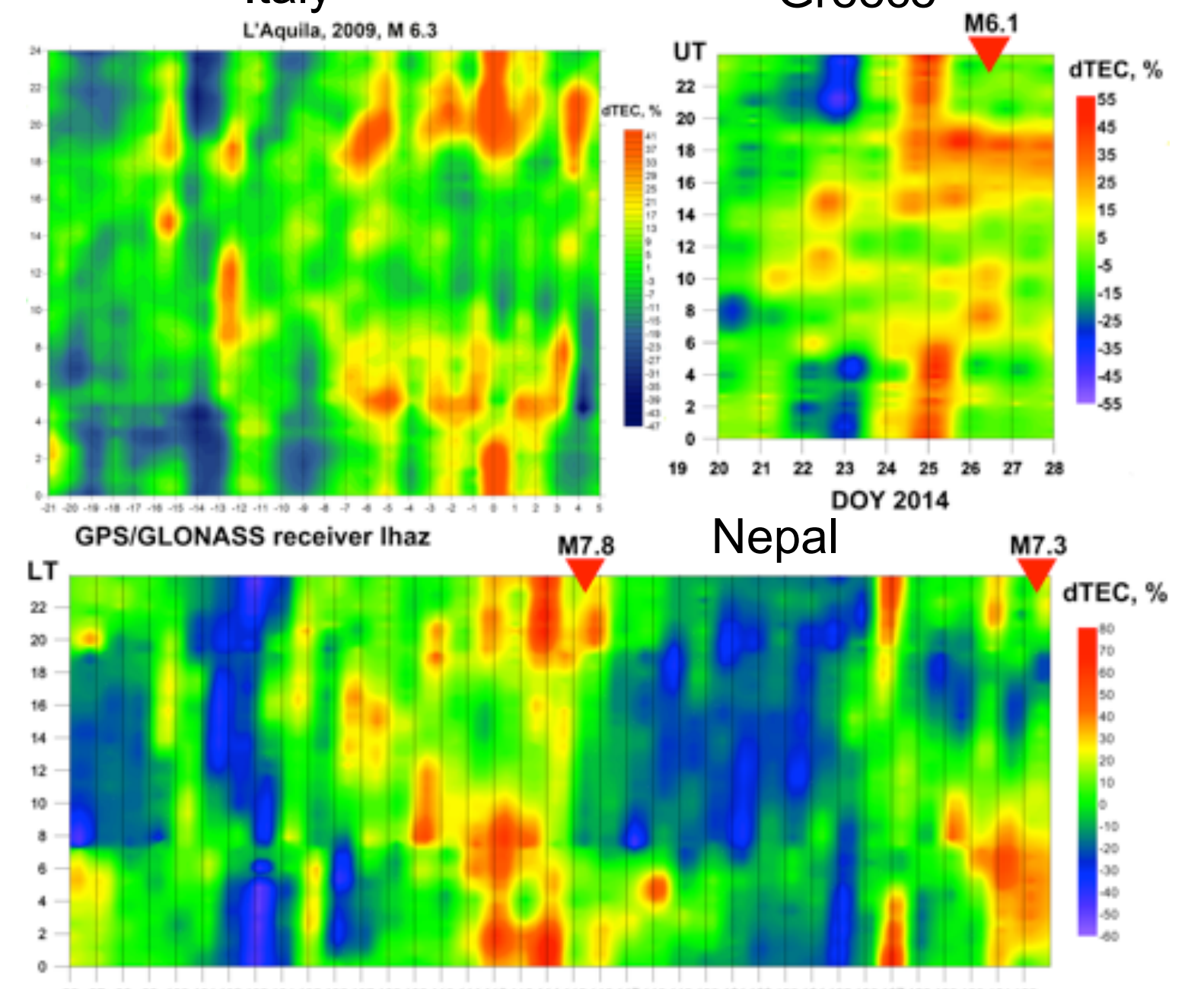
Condensation and nucleation, cloud formation



Satellite and ground observation during March 2011 over Fukushima, Japan



Ionospheric precursors of strong earthquakes in Europe and Nepal



Typical variations of ACP before earthquakes at Kamchatka region

