Atmosphere awakening prior to Abruzzo, Italy, M6.3 Earthquake of April 6, 2009 revealed by joined satellite and ground observations

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Latest studies related to Abruzzo earthquake (Italy) (Fall AGU 2009), have reported precursory signals observed on the ground and in space associated with earthquake of April 6, 2009. Further questions, that are still been debating in the science community are: (1) whether such signals systematically precede most of the earthquakes in the region; and (2) what is the physical link between the earthquake processes and the atmospheric/ ionospheric signals ? To address some of these we present four different data sets of continuous observations for 5 years period (2005-2009) and their temporal and spatial dynamics several days before the Abruzzo earthquake. This earthquake was in the middle point between three radon ground stations. Beginning March 30th, 2009 radon enhancement coincides (with some delay) with an increase in air temperature in the epicentral area. And subsequently from April 1 to 3, 2009 an increase of outgoing infra-red radiation was observed from satellite data. The GPS/Total Electron Content (TEC) data indicate an increase of electron concentration reaching a maximum on April 5, 2009. We have found a significant relationship between radon emanation and atmospheric and ionospheric anomalies associated with Abruzzo earthquake. This study conforms: (1) Our initial findings of atmospheric awakening prior to the Abruzzo earthquake; and (2) Demonstrate the presence of related variations of several parameters implying their connection to the earthquake preparation process. This study also can help to understand different short-term earthquake precursors and their association with earthquakes described by Lithosphere-Atmosphere-Ionosphere Coupling (LAIC) model.