

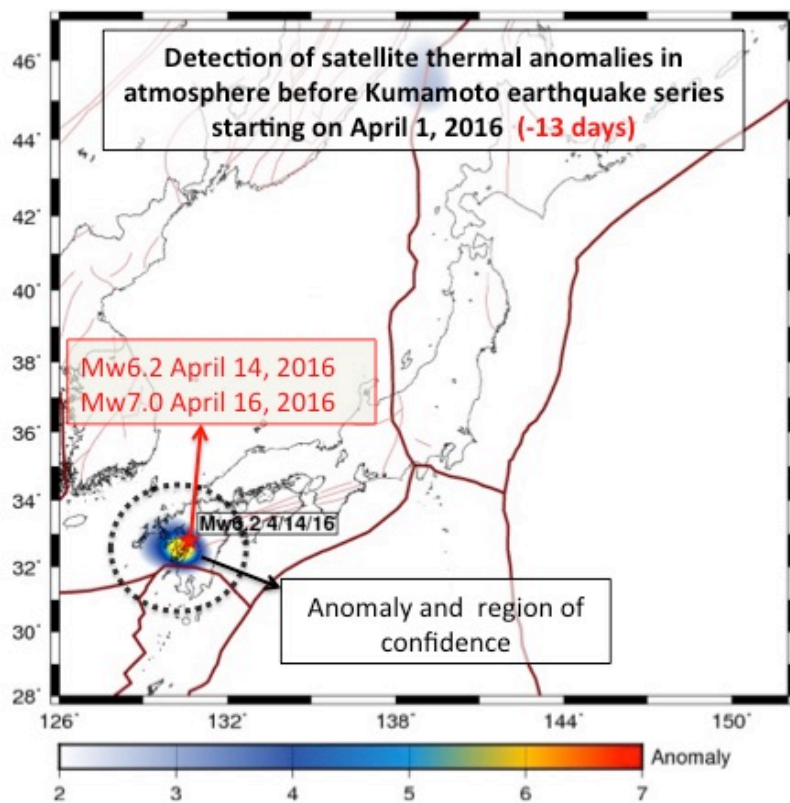
Observation of transient signatures in atmosphere and ionosphere prior to the 2016 Kumamoto earthquake in Japan. Preliminary results.

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The 2016 Kumamoto series of earthquakes started with M6.2 foreshock (12:26 UTC) on April 14, 2016 and continued with M7.0 series of 16:25 UTC on April 15) beneath Kumamoto City on Kyushu Region, Japan. The two earthquakes killed at least 48 people and injured about 3,000 others in total. We prospectively and retrospectively analyzed transient variation of specific physical parameters characterizing the state of the atmosphere and ionosphere several days before the onset of this earthquake, namely: outgoing earth radiation (OLR) on the top the atmosphere), atmospheric chemical potential (ACP) related to the thermodynamic proprieties in the lower atmosphere and for ionosphere the $F2$ -layer critical frequency ($foF2$). On April 1st , 2106 the satellite monitoring over Japan has shown a rapid increase of OLR near Kumamoto epicentral area. The ongoing analysis of satellite radiation revealed another transient anomaly over the epicentral area on April 12 (-3 days before the M7). The retrospective analysis of ACP from satellite assimilation data shows similar patterns of rapid increases on April 11-12 several hours earlier to the satellite transient anomalies. $F2$ -layer critical frequency data from Okinawa/Ogimi Ionosond (26.68°N, 128.15°E) show repeatable pattern of $foF2$ increase in the nighttime of April 13 (36 hours before the foreshock of M6.2 on April 14) and in the early morning hours of April 15 (20 hours before eth M7.0 of April 15th). Our preliminary results show correlation between the appearance of pre-earthquake transients anomalies in atmosphere and ionosphere (with a short time-lag, from hours up to few days) and the occurrence of 2016 Kumamoto, Japan earthquake series.

Keywords: pre-eartqhauke signals, Satellite thermal anomaly, Ionosond foF2



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