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Atmospheric Processes Associated with the M7.0 Haiti Earthquake of January 12th, 2010

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The 2010 Haiti earthquake was a catastrophic magnitude 7.0 Mw earthquake with the epicenter near Léogâne, approximately 25 km west of Port-au-Prince. At least 33 aftershocks been registered, fourteen of them between M5.0 and M5.9.We have analyzed temporal and spatial variations of fours different physical parameters characterizing the state of the atmosphere several days before the onset of the Haiti M7.0 earthquake of Jan 12, 2010.This work describes the first results from our analysis of: (1) emitted long-wavelength radiation (OLR);(2) Air temperature variations (NOAA/NCEP); 3) GPS Total Electron Content (TEC) measurements collected from ground based stations; and (4) ionospheric electromagnetic plasma measurements from the DEMETER satellite. Daily mean of OLR data (2003-2010) from NASA/Aqua AIRS sensor been used to study the variability of transient radiation in the zone of earthquake activity The first indication of the formation of a transient atmospheric anomaly in January was detected on Jan 8th (4 days before the main shock) with level of approximately two sigma above the monthly mean baseline. The maximum was co-located with epicenter and coincides with USGS shake map indicating for a maximum of intensity distributed around the epicentral area. The GPS/TEC data indicate an increase of DTEC in ionosphere during the period of 9-12 of January at local afternoon hours, and DEMETER observations of electron density show a slight decrease above the future epicentral area during local nighttime hours. The joined analysis of ground, atmospheric and ionospheric parameters during the M7.0 Haiti earthquake has conformed the presence of related variations of these parameters implying their connection to the earthquake preparation processes. The anomalies consistently occur over regions of maximum stress (along plate boundaries), and appear not to be meteorological origin due to the long persistence over the same region.