



Characterization of tropical cyclones in the South Indian Ocean by using GNSS observations

Rita Nogherotto (1), Riccardo Biondi (2), Jimmy Leclair de Bellevue (3), and Hugues Brenot (4)

(1) The Abdus Salam International Centre for Theoretical Physics, Earth System Physics Group, Trieste, Italy (rnoghero@ictp.it), (2) Beneficiary of an AXA Research Fund postdoctoral grant, Institute of Atmospheric Sciences and Climate, National Research Council, Rome, Italy, (3) LACy - Laboratoire de l'Atmosphère et des Cyclones, Saint Denis, Île de la Réunion, France, (4) Royal Belgium Institute for Space Aeronomy, B-1160 Brussels, Belgium

Tropical cyclones represent the most important weather system involving La Reunion Island and an accurate prediction of their track and intensity is crucial to reduce the damages caused by their strong precipitation and winds. Atmospheric water vapor is the main driver in the development of the cyclones and continuous observations of precipitable water (PW) from GNSS constitute a relevant tool in studying its temporal and spatial distribution. Because of the high temporal resolution of their observations, they allow the resolution of high-frequency (e.g. diurnal) variations and they can be used to study, monitor and predict weather extreme events such as the tropical cyclones.

In this work we apply GNSS technique to measure ZTD and to obtain PW over the Southern Indian Ocean for the entire observational available period (2006-2016). We present the response of PW due to the passage of tropical cyclones. Using Radio Occultation profiles, we retrieve the cloud top altitude to find the relationship with storm intensity and PW variation. In addition we show the monitoring of the water vapor contents in direction of GNSS satellites and preliminary results about the 3D field of water vapor density over Reunion Island using tomography for Bejisa cyclone. This tropical cyclone affected Reunion Island and Mauritius in the late December 2013 and early January 2014 with strong consequences both on the population and on energy supplies.