# Investigating how the accelerometer measurements of the GRACE C satellite are affected by geomagnetic disturbances.

*Myrto Tzamali* [1] , *Spiros Pagiatakis* [1]

[1] York University
Contact: myrtotz@yorku.ca

The aim of this study is the analysis of how the magnetic disturbances are visible in the residual series of the non-gravitational acceleration measurements from GRACE C satellite. In our analysis, we use an alternative weighted 1B dataset (ACW1B) of non-gravitational accelerations, which comprises the standard deviations of each measurement derived from the 1A data (10 Hz) using a weighted Gaussian filter with a cut-off frequency of 35mHz. We model the Solar Radiation Pressure and the drag components using orthogonal trigonometric functions based on the principle that the dominant force acting on the satellite when crossing the Earth's shadow, is the drag. Weighted residual series are derived in the along-track, cross-track and radial direction of the Science Reference Frame (SRF) and are analyzed based on their latitudinal, longitudinal and local time variations during consecutive months and periods of combined Solstices, and Equinoxes. For the purpose of this study, the residual series are investigated during the ascending and descending tracks of the orbit as well as orbit by orbit. Our results show that the residual series in the along-track direction are the most disturbed during periods of higher geomagnetic activity, while in the radial direction, the Earth Radiation pressure disturbances are visible. In the cross-track direction, the residual series reveal a strong signal due to magnetic inclination and thruster activations. A cross-wavelet analysis is presented between the residual series of the accelerometer measurements and the field-aligned currents (FACs), derived from the magnetic observations of the GRACE C magnetometer. Stronger disturbances are visible in the along-track and radial directions during noon and midnight in the polar regions and they relate to the local time dependency of the FACs.