



On the spatial pattern of semi-annual signals present in GRACE gravity fields

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GRACE monthly solutions clearly show mass changes and mass redistribution within the earth. Such variability is due to some known and unknown geophysical and geodynamical processes interacting in the earth system. One way to distinguish between these different sources is to analyze the compound gravity signals in the spectral domain to separate phenomena with different temporal resolutions. Since the launch of GRACE satellites, more than seventy monthly solutions have been released by different processing centers. As the time span of the available data increases, the possibility of significantly detecting signals with extended temporal wavelength will increase, too. In this work, a spectral analysis is performed to the GRACE geoids over the globe and the spatial patterns of some relevant periodicities are shown as well as regions with secular changes. Besides some well known temporal variations like secular changes and annual cycles, our study explicitly shows the existence of semi-annual signals with considerable amplitudes in Nepal and northern India as well as in the Polar Regions. The significance of the signals is discussed and probable explanation will be given as well.