



## **Zonal winds in the thermosphere observed by CHAMP: Diurnal variation and climatology**

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This study utilizes three years of continuous wind measurements from the accelerometer on board the CHAMP satellite. Thermospheric winds play an important role in the ionosphere-thermosphere coupling through dynamo effects and transport of plasma along magnetic field lines. A comprehensive picture of the wind characteristics has so far been missing, partly due to insufficient measurements. CHAMP on its polar orbit covers all latitudes and wraps around local time 8 times during the considered 3 years. This large and homogeneous dataset clearly shows the typical diurnal variation. It is, in addition, also sufficient to decompose the effects of seasonal, geomagnetic, and solar flux influences on the zonal wind in the upper thermosphere. Our analysis, focusing on latitudes around the dip-equator, has revealed a strong dependence of the wind on the solar flux level. High flux levels favor eastward winds. The effect of geomagnetic activity is less prominent and partly surprising. Its influence is restricted to the night time hours. A comparison with the wind model HWM shows reasonable agreement at night but large differences during day time. We finally make use of the CHAMP data to investigate the legendary but still controversial topic of atmospheric super rotation.