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Multiple Satellite Analysis of the Earth's Thermosphere and Interplanetary Magnetic Field Variations due to ICME/CIR Events During 2003–2015

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We present a refined statistical analysis based on ICMEs as well as CIRs for the time period 2003-2015 to estimate the impact of different solar wind types on the geomagnetic activity and the neutral density in the Earth's thermosphere. For the time-based delimitation of the events, we rely on the catalog maintained by Richardson and Cane and the corotating interaction region lists provided by S. Vennerstrom and L.K. Jian. These archives are based on in situ measurements from the ACE and/or the Wind spacecraft. On this basis, we will thoroughly investigate about 400 Earth-directed ICME and CIR events. To verify the impact on the Earths thermosphere we determine neutral mass densities by using accelerometer measurements collected by the low-Earth-orbiting satellites GRACE and CHAMP. Subsequently, the atmospheric densities will be to characteristic ICME parameters and since increased solar activity may lead to a decrease of the satellites orbital altitude we additionally assess the orbital decay for each of the events and satellites.