

15th IAA SYMPOSIUM ON SPACE DEBRIS (A6)  
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AustriaATTITUDE DEPENDENT PERTURBATIONS OF SPACE DEBRIS ORBITAL DYNAMICS DURING  
SOLAR ACTIVITY EXTREMES**Abstract**

The dynamics of Earth-orbiting defunct satellites are perturbed by the space environment forces. The accurate estimation of the forces acting on the debris objects is necessary to analyze and predict their orbital motion for the estimation of the conjunction probabilities.

The major forces perturbing the orbital motion of the geostationary (GEO) satellites are produced by the Earth's gravity and magnetic fields, solar radiation pressure and the charged particle flux trapped in the Van Allen belts. The conditions of the space environment at GEO altitudes as well as the atmospheric densities at LEO depend on the space weather parameters defined by the solar activity.

We use the realistic models of the satellites and the environmental conditions during the solar minimum and maximum periods to estimate the perturbations experienced by the defunct box-wing satellites and investigate the differences over the solar cycle.

This presentation will quantify the impact of the solar activity on the magnitude of environmental forces and torques exerted on the defunct satellites: Topex (LEO, perigee of 1340 km), GLONASS-41 (HEO, 19140 km), Optus-B1 (GEO, 36100 km).