Geophysical Research Abstracts, Vol. 9, 09628, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-09628

On the charged particle environment of Titan during the T9 flyby

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The Cassini spacecraft flew by Titan on 26 December 2005, presumably crossing its plasma tail region. This flyby was distinct from the others, because in general the spacecraft enters into the perturbed plasma environment of Titan only once; whereas during this flyby in entered twice. During the first so called “tail event” the charged particle analysers measured cold charged particles of a few eV temperature, and composed dominantly of heavy ions in the 16-32 amu range. During the “second tail event” the positively charged particles were dominantly light ones (amu=1,2), and their bulk energy was of the order of 100 eV. The magnetic field was highly inclined relative to a dipole configuration during this flyby. Our explanation of this encounter is that during the first “tail event” the spacecraft was magnetically connected to the cold plasma region that exists above Titan’s ionosphere, and these cold particles reached the spacecraft escaping along the magnetic field lines having sort of a corkscrew formation. Even electrons of ionospheric origin were detected. The signatures of the second “tail event” were closer to an average tail crossing.