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Upstream wave related Pc3 pulsations observed by CHAMP

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CHAMP is the first satellite that made possible the detailed analysis of compressional ULF waves in the topside ionosphere. Based on the unprecedented precision magnetic measurements the distribution of dayside compressional waves could be established. We could show that the topside compressional wave activity is closely related to the upstream ULF activity. In accordance with the observations, the latest modelling efforts could explain the presence of the incoming compressional mode in the topside ionosphere. The ground signatures of the compressional mode was found in the H-component. The coherence between Pc3s observed on the ground and onboard CHAMP was high over wide latitude and longitude ranges.
Using seven years of observations we could also demonstrate a north-south hemispheric asymmetry in the wave power distribution and its seasonal and solar cycle variation. In the highly inhomogenous magnetosphere the incoming compressional mode waves couple to Alfvén mode, drive field line resonances redistributing the ULF energy. The study of mode coupling processes demands the inclusion of all components in the investigation.
Here we summarize our results and describe future plans.