NUMERICAL RESULTS FOR AN ALFVEN SWEEP-MASER MODEL OF PC 1 PEARLS

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We present numerical simulations of a self-consistent model for generation of Pc 1 pearl emissions, known as Alfven sweep maser (ASM) model. It is based on nonlinear coupling between the magnetospheric and ionospheric resonators for Alfven waves, The coupling mechanism is related to the variation of the reflection coefficient R of Pc 1 emissions from the ionosphere under the influence of energetic protons precipitated into the ionospheres due to generation of these Pc 1 waves in the magnetosphere. We take into account both the nonlinear feedback described above and the group velocity dispersion of Alfven waves. Results of simulations prove the establishment of a bouncing Pc 1 wave packet (pearl) which depends on the ionospheric and magnetospheric parameters. We show that a pearl-like regime of wave generation is possible in a wide range of parameters; in particular, properties of conjugate ionospheres may be different. The ionospheric reflection substantially influences formation of pearls even if the ionospheric reflection coefficient is small, R ~ 0.1-0.2. Formation of pearl-like dynamic spectra in the course of slow variation of ionospheric parameters and energetic protons in the magnetosphere is demonstrated.