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Observations of intense whistler-mode waves and simulations of associated acceleration of electrons CYNTHIA CATTELL, School of Physics and Astronomy, University of Minnesota, Minneapolis MN, AARON BRENEMAN, KEITH GOETZ, PAUL KELLOGG, KRIS KERSTEN, LYNN WILSON III, JOHN WYGANT, SPA, UMn, STUART BALE, ILAN ROTH, SSL, UC, Berkeley CA, MILAN MAKSIMOVIC, LESIA, Meudon, France — Observations from waveform capture instruments on STEREO and Wind have shown that large amplitude whistler-mode wave packets occur in the Earth's radiation belts, in stream interaction regions and at shocks. Amplitudes are 1 to 2 orders of magnitude larger than previously reported from observations and than those assumed in most theoretical models of wave/particle interactions in these regions. The waves are often monochromatic, obliquely propagating, and have both large longitudinal components and components parallel to the background magnetic field. Particle tracing code results show that, in the radiation belts, the waves can result in energization by many MeV during a single wave packet encounter due to coherent, nonlinear processes including trapping. Simulation results also indicate that the waves can scatter electrons by 10s of degrees in both solar wind and magnetospheric conditions. The results suggest that coherent processes with time scales of seconds, rather than quasi-linear processes with timescales of hours to days, may sometimes dominate scattering and energization by waves.

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