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Observations and modelling the wave mode evolution of an impulse-driven 3 mHz ULF wave.

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Employing a combination of the Doppler Pulsation Experiment (DOPE), an HF doppler sounder, in conjunction with the International Monitor for Auroral Geomagnetic Effects (IMAGE) network of ground magnetometers, the Advanced Composition Explorer, IMP-8 spacecraft and a numerical model we examine the evolution of a Ultra Low Frequency (ULF) upstream wave from fast compressional to Alfvénic behavior. The relative phases and amplitudes of the signatures in the doppler and ground magnetometer data are compared with a numerical model for the generation of doppler signatures from incident ULF waves. A one-dimensional model of wave propagation from the magnetosphere, through the ionosphere to the ground with an oblique magnetic field is employed. HF signals that propagate via the ionosphere exhibit doppler shifts due to a number of processes that give rise to a time dependent phase path. The HF radio path is calculated, and compared to observations. The event that occurred on 16th April 1998 was the result of an impulsive disturbance as seen in the ACE and IMP-8 spacecraft data and the IMF dynamic pressure increased at approximately the right time and produced a low-*m* (-6) field line resonance with a large characteristic scale size. Ground magnetic field and doppler observations were used to find model inputs at various points throughout the event. We find evidence that the wave mode evolved from a mixture of fast and Alfvén mode at the beginning of the event to an almost purely Alfvénic mode after 6 wavecycles (33 minutes).