Waves in the plasma depletion layer derived from three magnetosheath passes made by wind
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We analyze theoretically wave activity in the plasma depletion layer (PDL) based on measurements made by the WIND spacecraft on 3 passes of the magnetosheath at low, southern magnetic latitudes and within 1 hour of noon. The passes occurred on November 30, December 12, and December 24, 1994. They were under moderate-to-low solar wind dynamic pressure, allowing a characterization of the near-subsonal PDL under typical solar wind conditions. Magnetic fluctuations transverse to the background field characteristic of electromagnetic ion cyclotron waves are present in all 3 PDLs and we illustrate this by the December 24, 1994 pass. We estimate numerically the electromagnetic ion cyclotron wave excitation, using measured parameters and supplementing these by average values for those other parameters which were not available. The activity increases as the magnetopause is approached, except for November 30. The interplay of the proton thermal anisotropy and the proton beta parallel to the magnetic field, quantities that are anticorrelated, may be used to explain the major similarities and differences of the theoretical results for the respective passes. These are the only 3 passes near the subsolar region for moderate-to-low dynamic pressure which have been examined to date, and the only ones made in this locale by Wind.