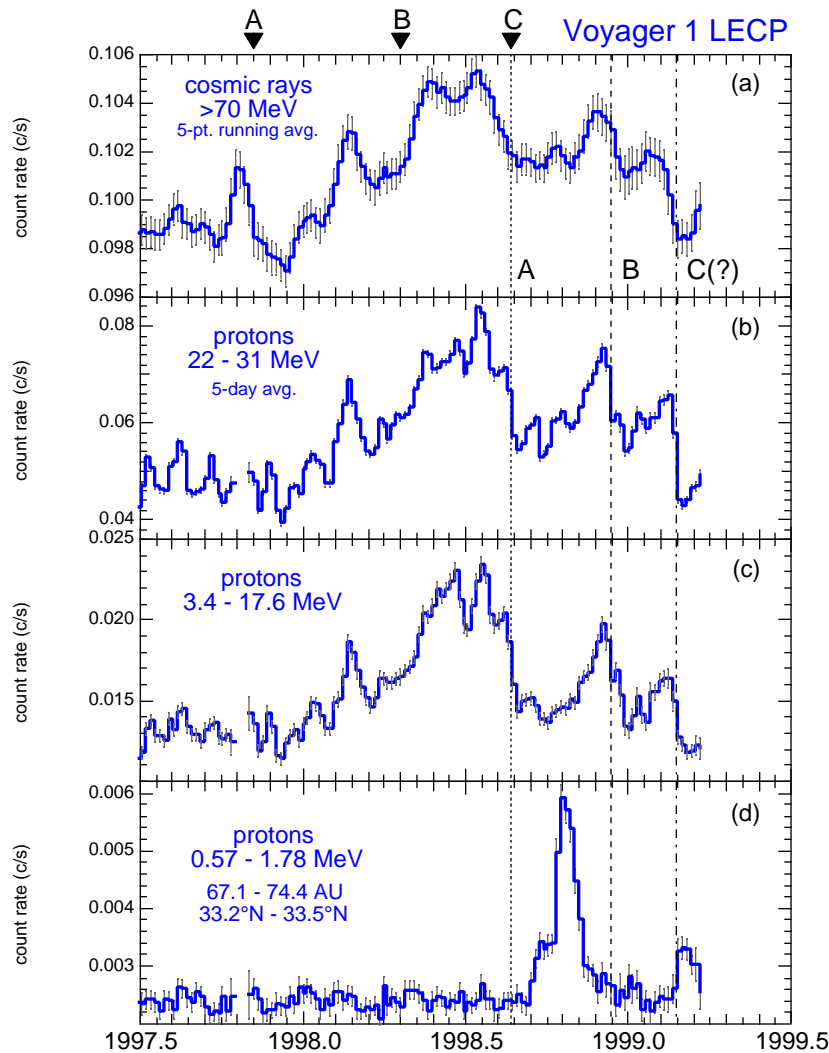
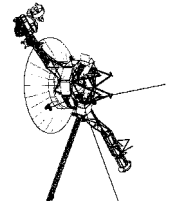




Solar Minimum Marked by Onset of Cosmic Ray Decrease at 70 AU by Voyager 1 Detectors



- The onset of activity for Solar Cycle 23 started at Earth in the fall of 1997 but did not reach Voyager 1 until several months later, as seen by the decrease in cosmic rays beginning in July 1998, panel (a).
- Figure shows Voyager 1 LECP proton rate data from mid-1997 through March 1999. Panels are: (a) galactic cosmic rays (GCR); (b), (c) anomalous cosmic rays (ACR); and, (d) low-energy protons, which originate mainly at the Sun or at heliospheric shocks.
- During 1992 to mid-1998, intensities of GCR and ACR protons increased steadily, on average, while those of low-energy protons remained near background, except during passages of corotating interaction regions.
- Panel (a)-(c): merged interaction regions (MIR) from solar active periods marked on top axis as A (11/97), B (04/98), and C (08/98-tentative) cause rapid decreases in ACR and GCR (vertical lines) after delays for MIRs with speeds ~ 500 - 700 km/s to travel to ~ 70 AU.
- Panel (d): solar energetic particles from 04/98 activity arrive well ahead of slower MIR (line B); small increase after disturbance C may indicate shock acceleration.
- LECP data from Voyager 2 show similar behavior.
- Submitted by LECP Team (Rob Decker) 06-Mar-99