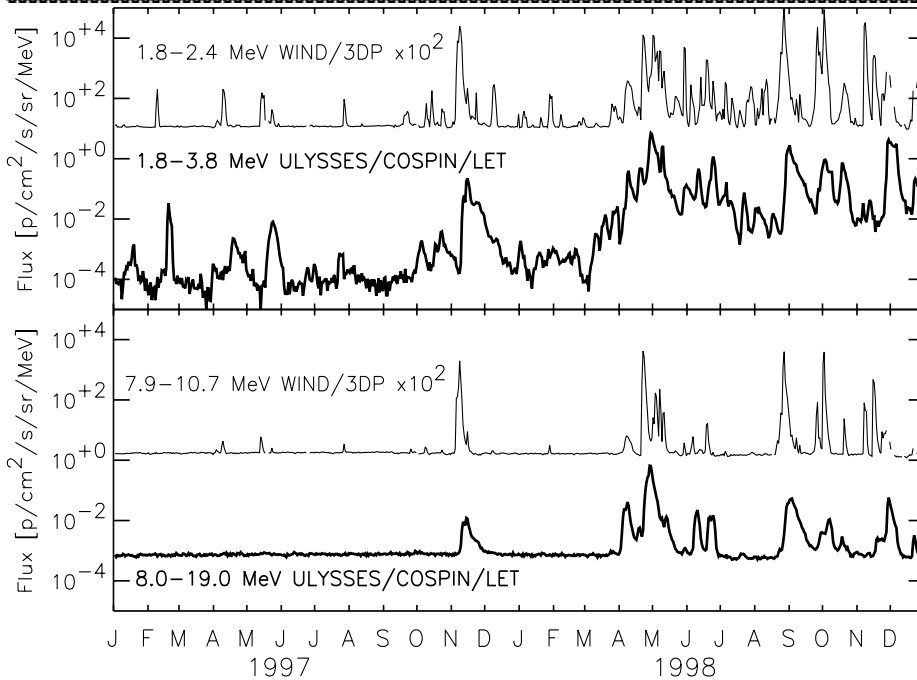
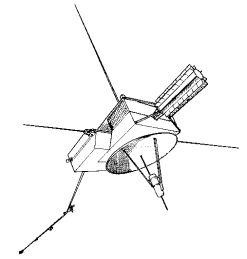




Solar Energetic Particles: Multiple injections of particles from CMEs produce elevated minimum fluxes at 5 AU during 1998



Solar energetic particle fluxes observed by Ulysses at ~5 AU and by Wind at 1 AU show an almost one-to-one correlation during 1997-1998. At 1 AU, these flux enhancements are associated with Coronal Mass Ejections (CMEs) and CME related shocks. The effects of the increasing level of solar activity since April 1998 are clearly seen in the right-half of the figure. Although corresponding events between both spacecraft can be identified, the minimum fluxes at Ulysses remain elevated in 1998. This persistence is attributed to low energy “seed” particles released by the active Sun in multiple CMEs which are transported and accelerated near Ulysses by CME-driven shocks and by shocks that form beyond 1 AU associated with Corotating Interaction Regions (Lario et al., JGR, 105, 18235, 2000a, and JGR, 105, 18251, 2000b).

Daily averaged fluxes of (a) 1.8-2.4 MeV and (b) 7.9-10.7 MeV protons observed by WIND (thin traces) and (a) 1.8-3.8 MeV and (b) 8.0-19.0 MeV protons observed by Ulysses (thick traces) during 1997-1998. Wind fluxes are scaled up by two orders of magnitude.