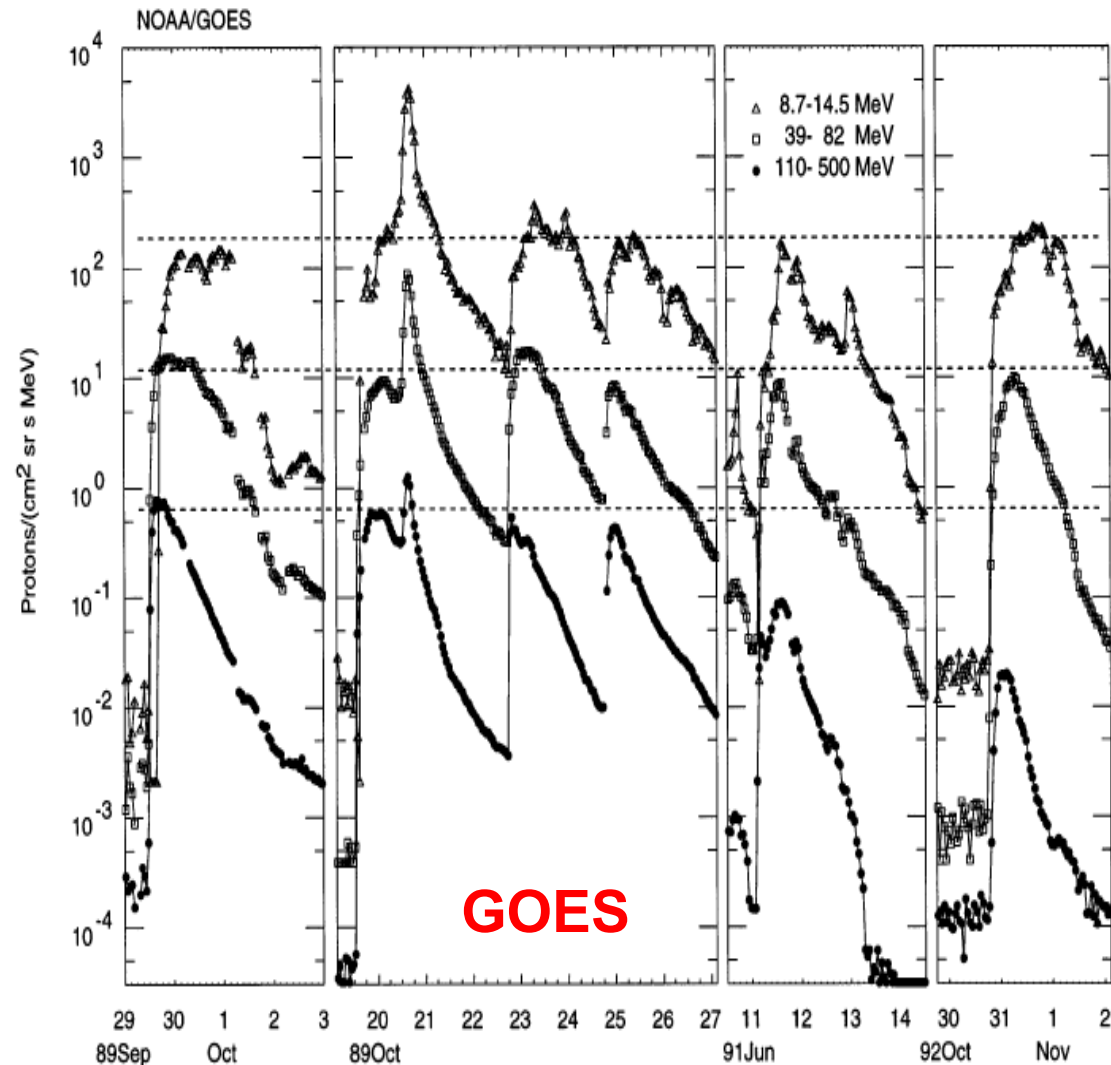
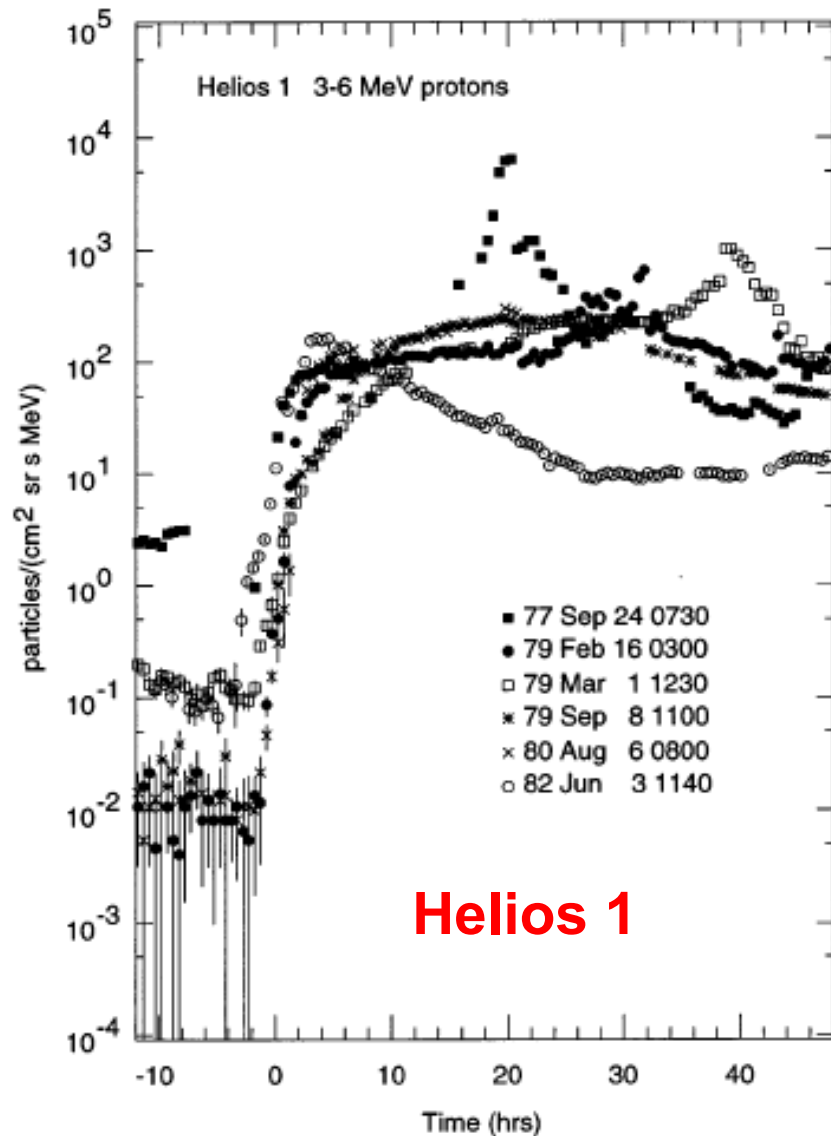
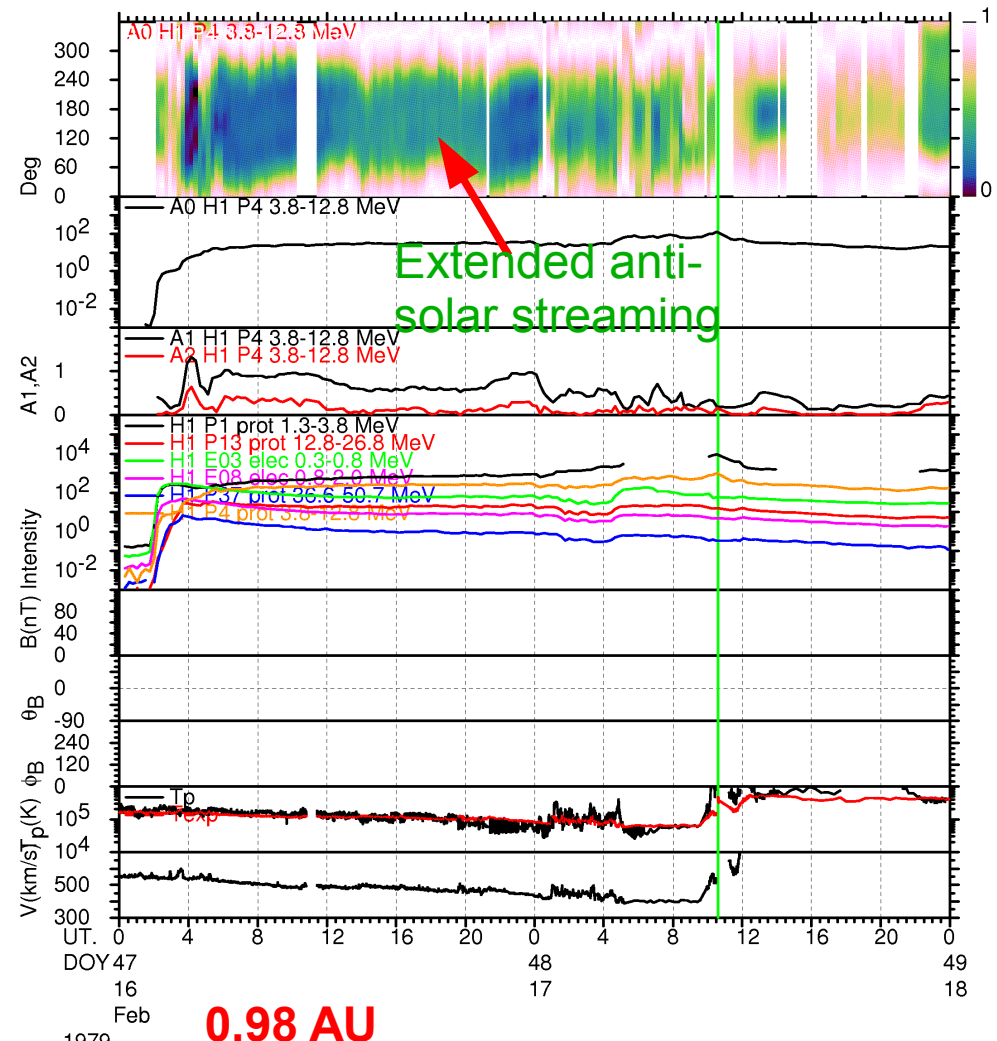
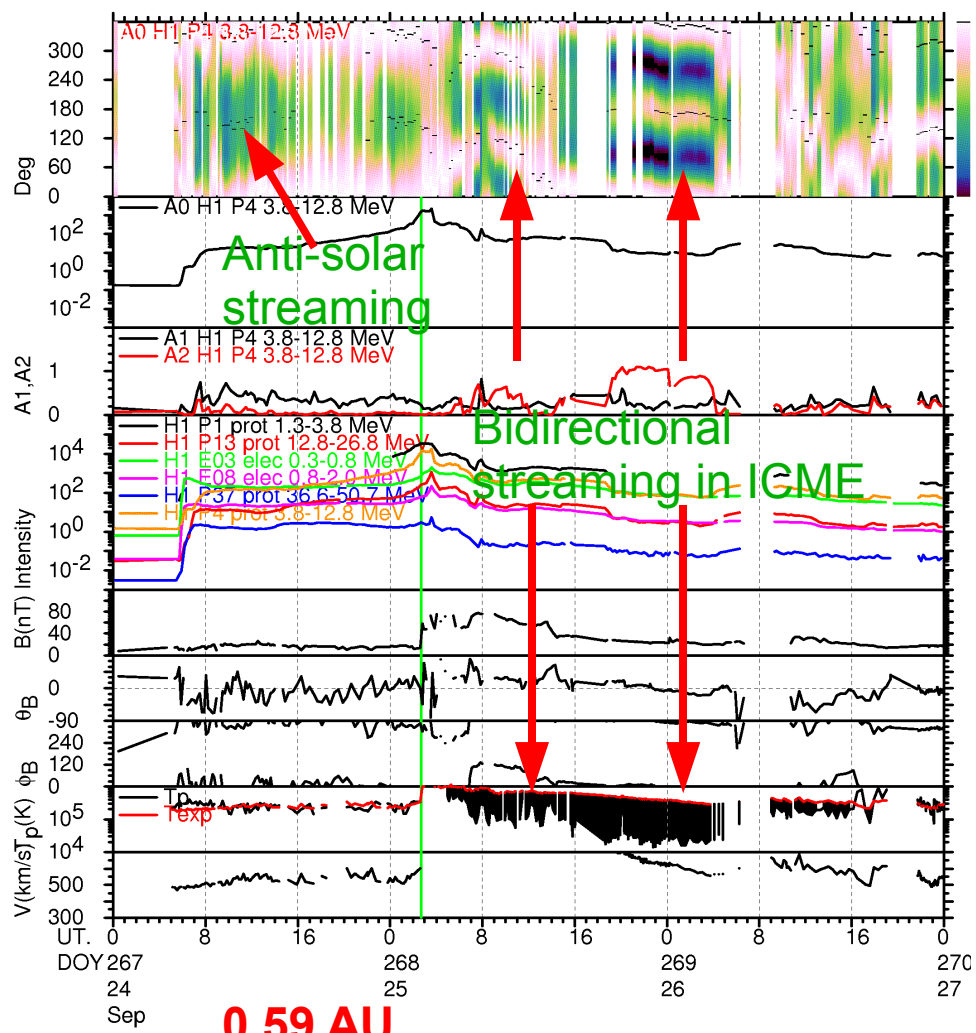


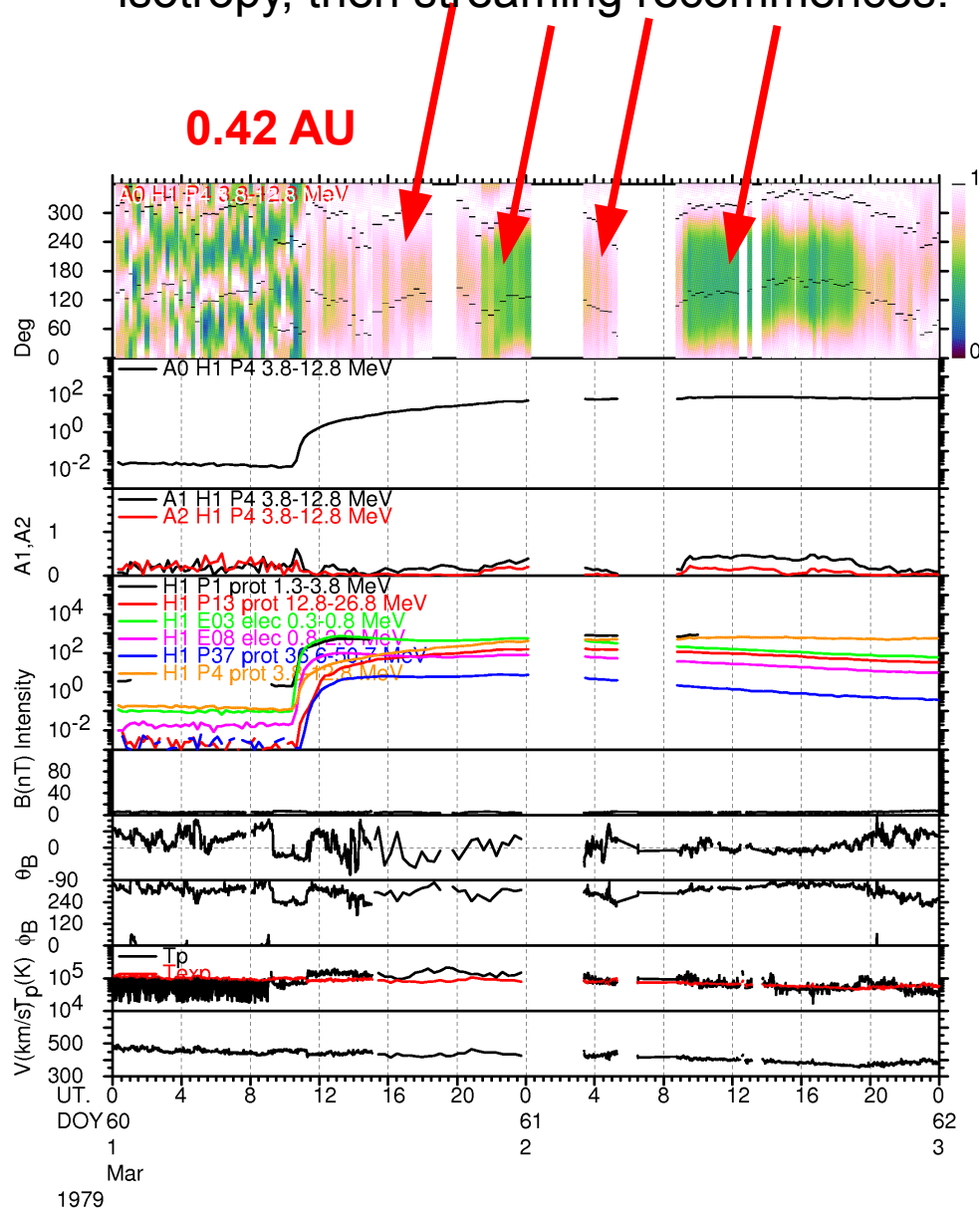
Ion Anisotropies During the Reames et al. [1998] “Streaming Limit” Events



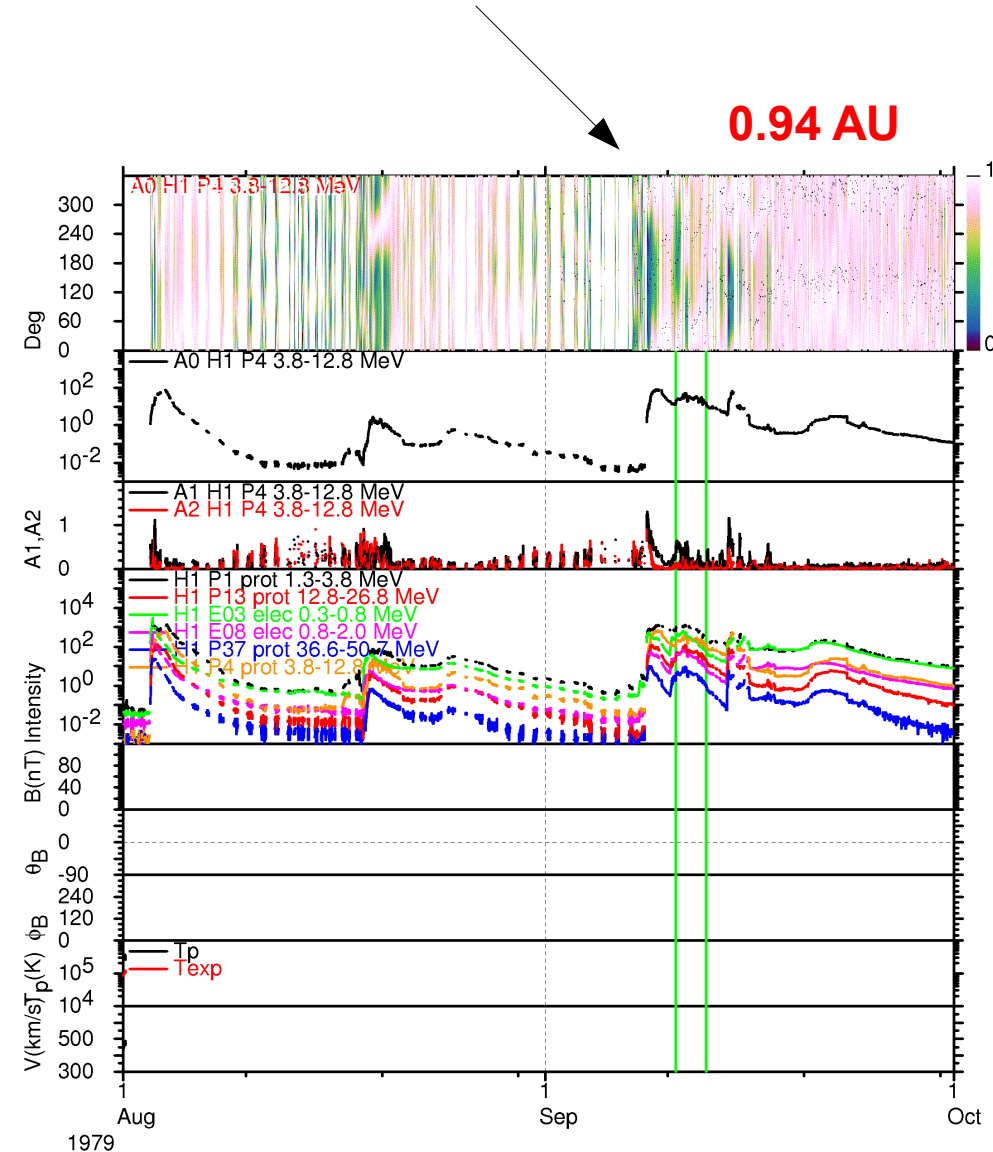
Observations from the Kiel instrument on Helios 1, plus plasma/field data in the bottom panels to provide context. Vertical green lines indicate shocks as identified by Rainer Schwenn. The top three panels show the angular distribution (a 3rd-harmonic Fourier fit to 8 sector data), counting rate, and amplitudes of the 1st and 2nd harmonics of 3.8-12.8 MeV protons. Light shading near the top of the top plot indicates flow away from the Sun along the nominal Parker spiral (~315deg.) This is just one of 8 sets of anisotropy observations available for ions and electrons spanning ~1 MeV to ~50 MeV, though not all may have sufficient particle counts to provide statistically significant anisotropies. The time resolution here is 15 minutes. There are also independent observations for protons and electrons from the Goddard instrument on H1. They are usually similar, but have more data gaps.



Complicated! Flow is near-isotropic during first few hours of event, then anti-solar flows develop, followed by a return of ~isotropy, then streaming recommences.

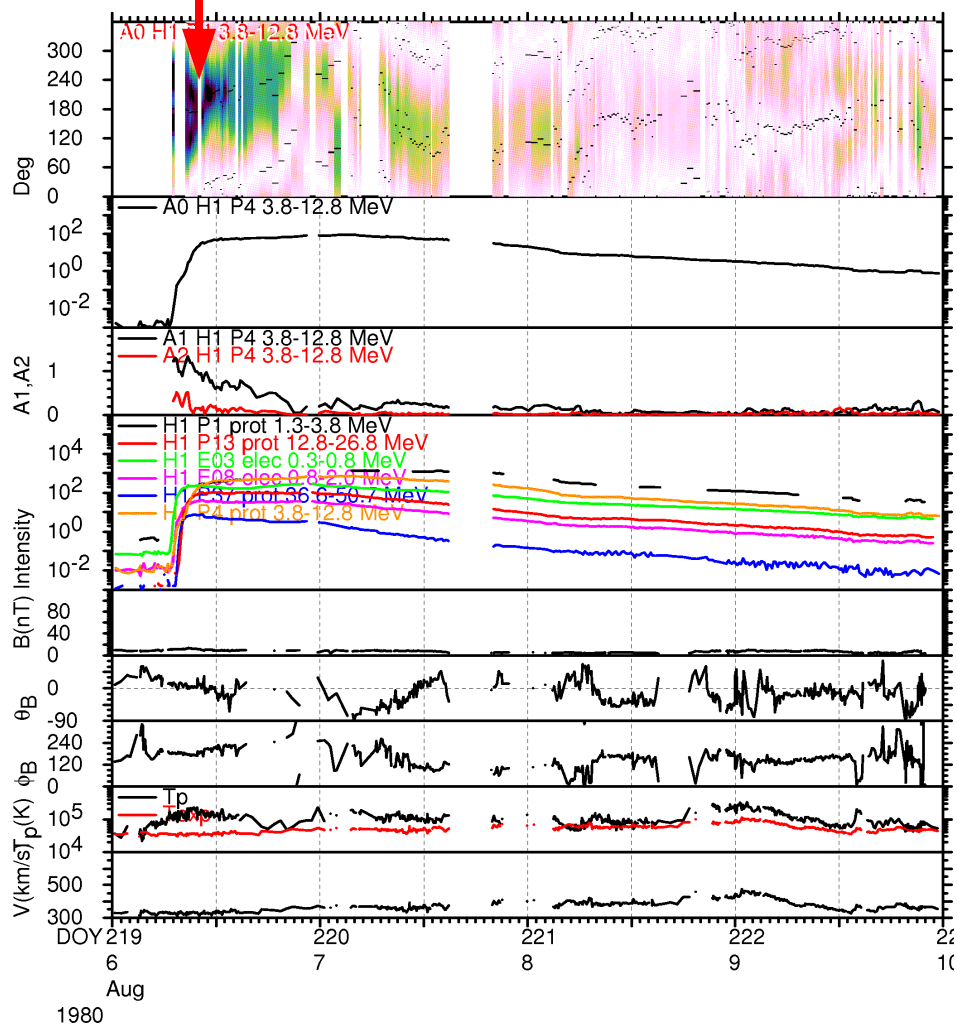


Have a problem with my plotting program here, because of a plasma data gap, but can fix. Looks like strong antisolar streaming in event of interest.



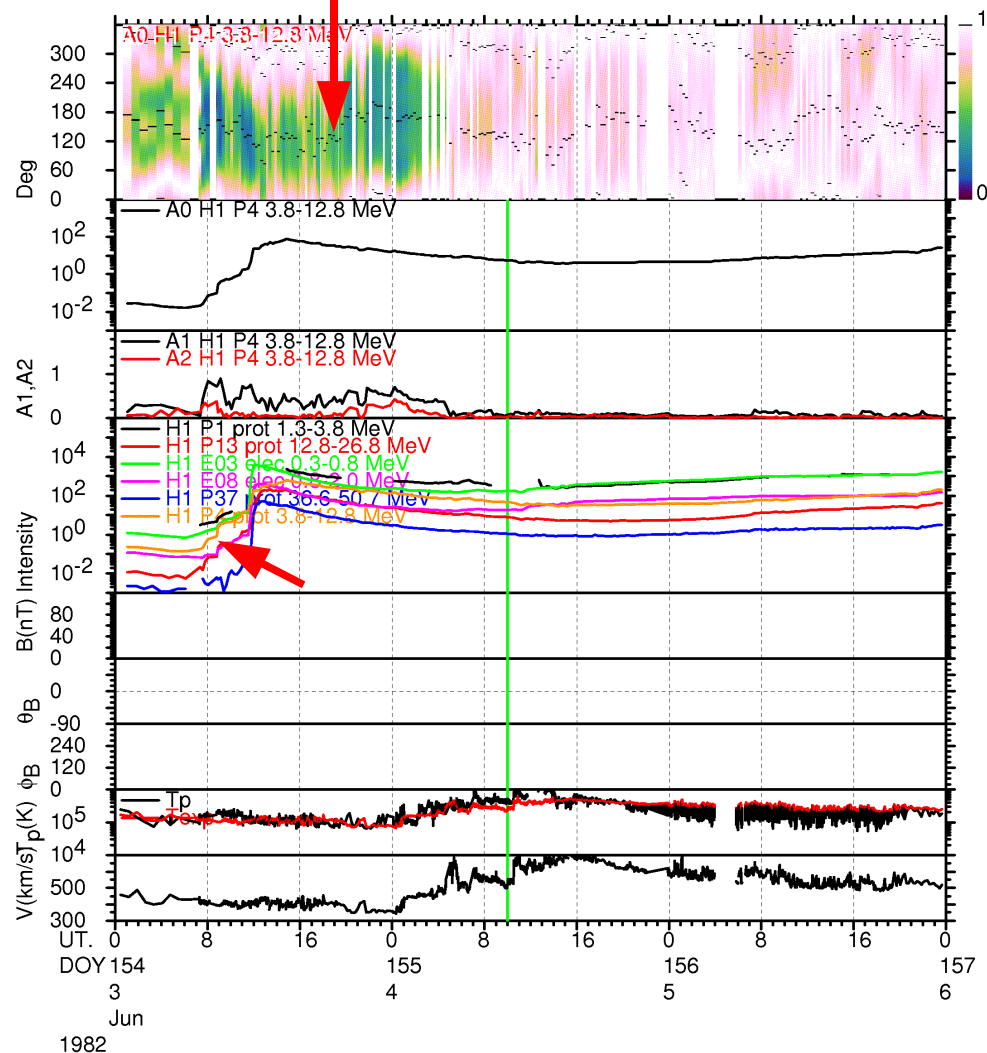
Strong streaming; anti-solar, but unusual field direction, just west of the of the Sun-S/ C line, so light shading is near the bottom of the top plot. Such unusual field directions often occur in ICMEs, but this is not the case here.

0.93 AU

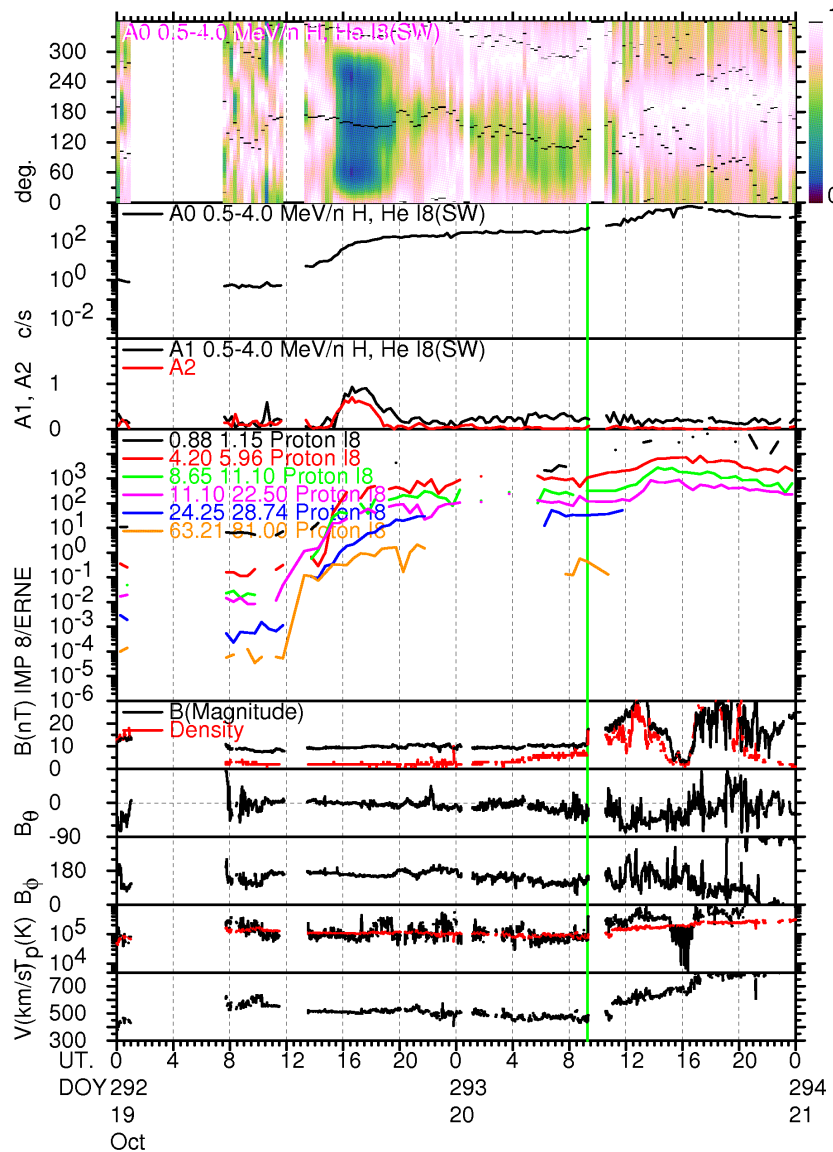


May be slow rise event just preceding main event?
Anti-solar streaming turning to near isotropic a few hours ahead of shock arrival

0.6 AU



IMP 8 0.5-4 MeV; Near isotropic early in event, changing abruptly to strong anti-solar streaming, then becoming less anisotropic. Flow reversal close to shock passage



Majority of “streaming limit” events do show prolonged streaming at a few MeV, but two show more isotropic distributions for part of early stages of event.

Details vary from event to event. Some variations in anisotropy may be related to changes in local SW?

Distributions do not appear to be affected by saturation in sector(s) viewing along the beam direction (Glenn's caution). Variations in anisotropy as $f(E, t)$ in each event may be interesting. Also, may see some of these events at Helios 2 and/or IMP 8 or ISEE-3, so could compare spatial/temporal evolution.