Propagation of Bastille Day Event to Voyagers 1 & 2

- **The Bastille Day (July 14, 2000) CME was the biggest so far this solar cycle**
- **This CME is similar to those thought to have triggered the two episodes of heliospheric radio emission observed in 1983 and 1992**
- **The emission results from the interaction of a large shock with the enhanced plasma past the heliopause.**
- **We model the propagation of this shock out to the heliopause to predict when it will reach the heliopause and thus when the radio emissions may begin.**
- **The exact timing of this radio emission would help pinpoint the location of the heliopause.**

[Wang, Richardson, and Paularena, JGR, in press, 2001. Submitted by John Richardson]

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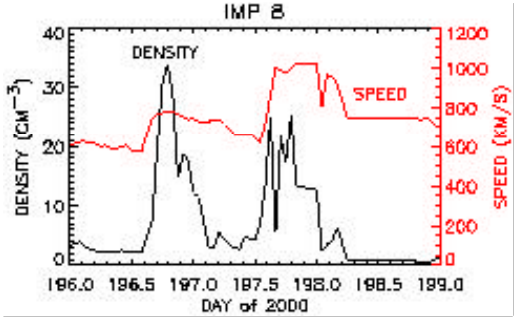
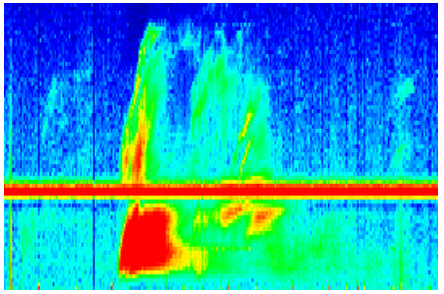
Bastille day event:

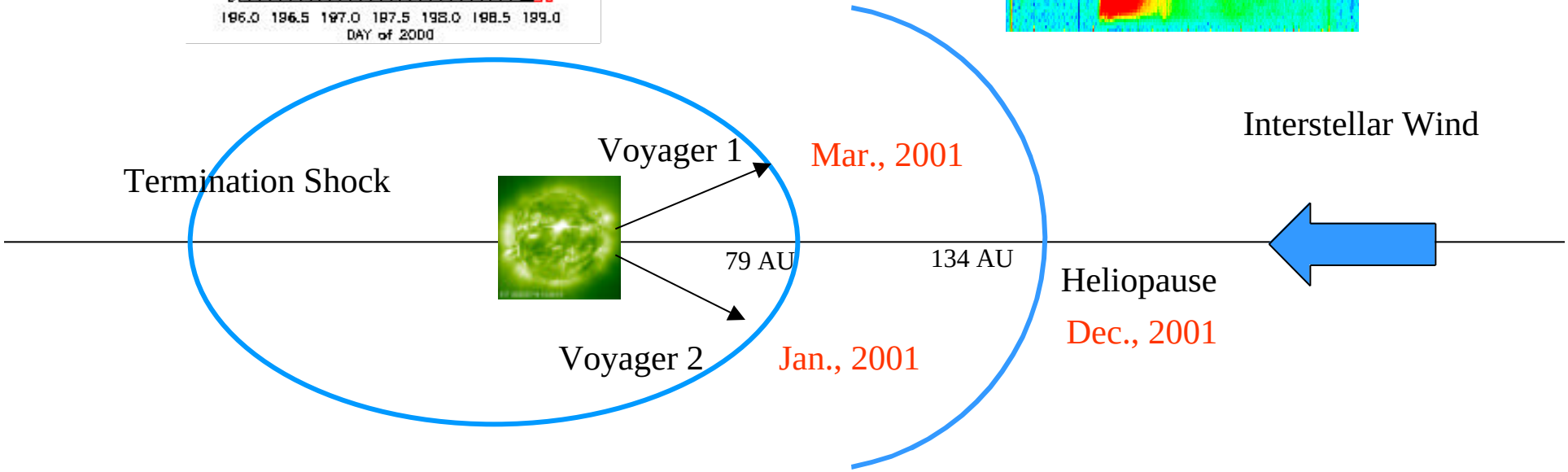
at Earth: 22% Forbush decrease (Moscow Neutron Monitor) (1982: 21%, 1991: 29%)

Solar wind density: Solar wind speed > 1000 km/s for ~12 hours) (1982: > 850 km/s for 5 hours, 1991: >850 km/s for 7 hours) (There are only 2 other events since 1973 with speeds > 850k/s for >2 hour)

Background: Two episodes of heliospheric radio emission have been observed, beginning in 1983 and 1992. Gurnett et al. hypothesize the emissions are triggered when large shocks, in particular those associated with CMEs which passed Earth in 1982 and 1991, cross the heliopause. The Bastille day CME (July 14, 2000) could trigger another such episode.







Predictions (based on 1-D MHD model):

1. Shock will reach Voyager 2 in Jan. 2001; speed increase 70 km/s, density increase by a factor of 1.7
2. Shock will reach Voyager 1 and termination shock in March 2001
3. Shock will reach heliopause in December 2001: may turn on heliospheric radio emission at that time.