

## SOLAR WIND 10 ABSTRACT

### Open magnetic Flux: Variation with Latitude and Solar Cycle

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During solar minimum, the Ulysses mission revealed that the flux of open magnetic fields, as measured by the radial field component,  $B_R$ , multiplied by the square of the radial distance,  $r$ , was invariant. This measure, averaged over successive solar rotations, was independent of both heliolatitude and time. Since the sun's dipole magnetic field is strongest and relatively unchanging near solar minimum, this result implied that excess magnetic pressure at high latitude was causing the non-radial flow of the solar wind from the polar caps near the sun. The recent Ulysses observations from pole-to-pole during solar maximum show that the open flux is still independent of time and latitude. Moreover, the amount of open flux is essentially the same as at solar minimum. This invariance is surprising in view of the dramatic changes that take place in the sun's magnetic field between minimum and maximum. An invariance is also surprising in view of the large increase in the average magnitude of the heliospheric field near solar maximum that has been seen the last several cycles. Nevertheless, the constancy of open flux is, in fact, consistent with the prediction of a recent model in which reconnection at the sun occurs predominantly between fields that are already open. Because the total unsigned solar flux decreases by a large factor from maximum to minimum, the ratio of open to closed flux varies from about one tenth at maximum to one-half at minimum. The Ulysses results obtained during minimum and maximum will be presented and the implications will be explored in this talk.