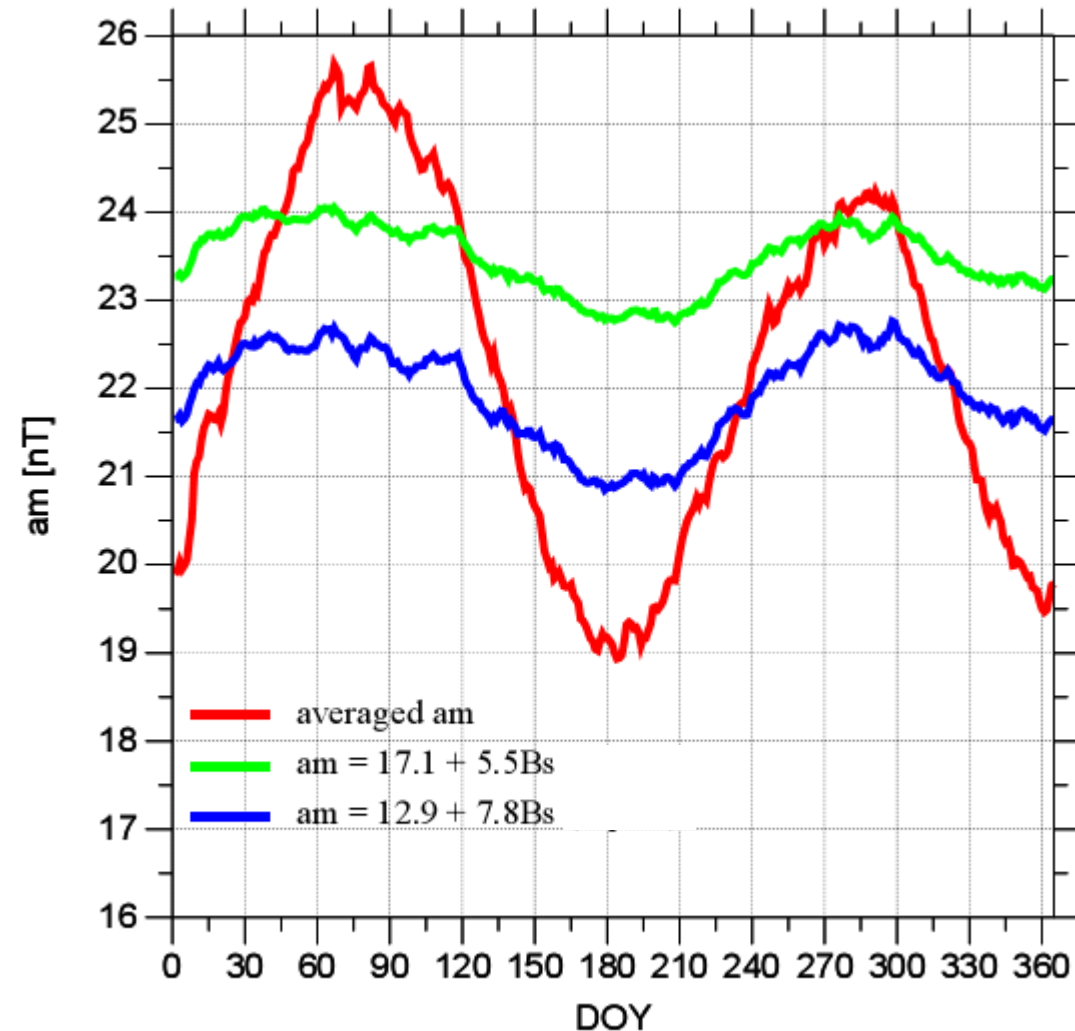


Missing semiannual variation

- Russell and McPherron [1972]: Semiannual variation in geomagnetic activity explained by semiannual variation of effective solar wind input.
- Mayaud [1973] – Problem because diurnal (UT) prediction
- Cliver [2000] – Problem because of day-of-year amplitude plot (see next slide); Could be angle between V_{sw} and dipole
- Newell et al. [2002] – Could be “UV insulation” effect
- Russell et al. [2003] – Could be day-of-year variation in reconnection line length effect

Importance of a Model



Blue only predicts about 33% of actual semiannual variation. (0% for AL)

(Implied) Model of SW/M-I coupling is:

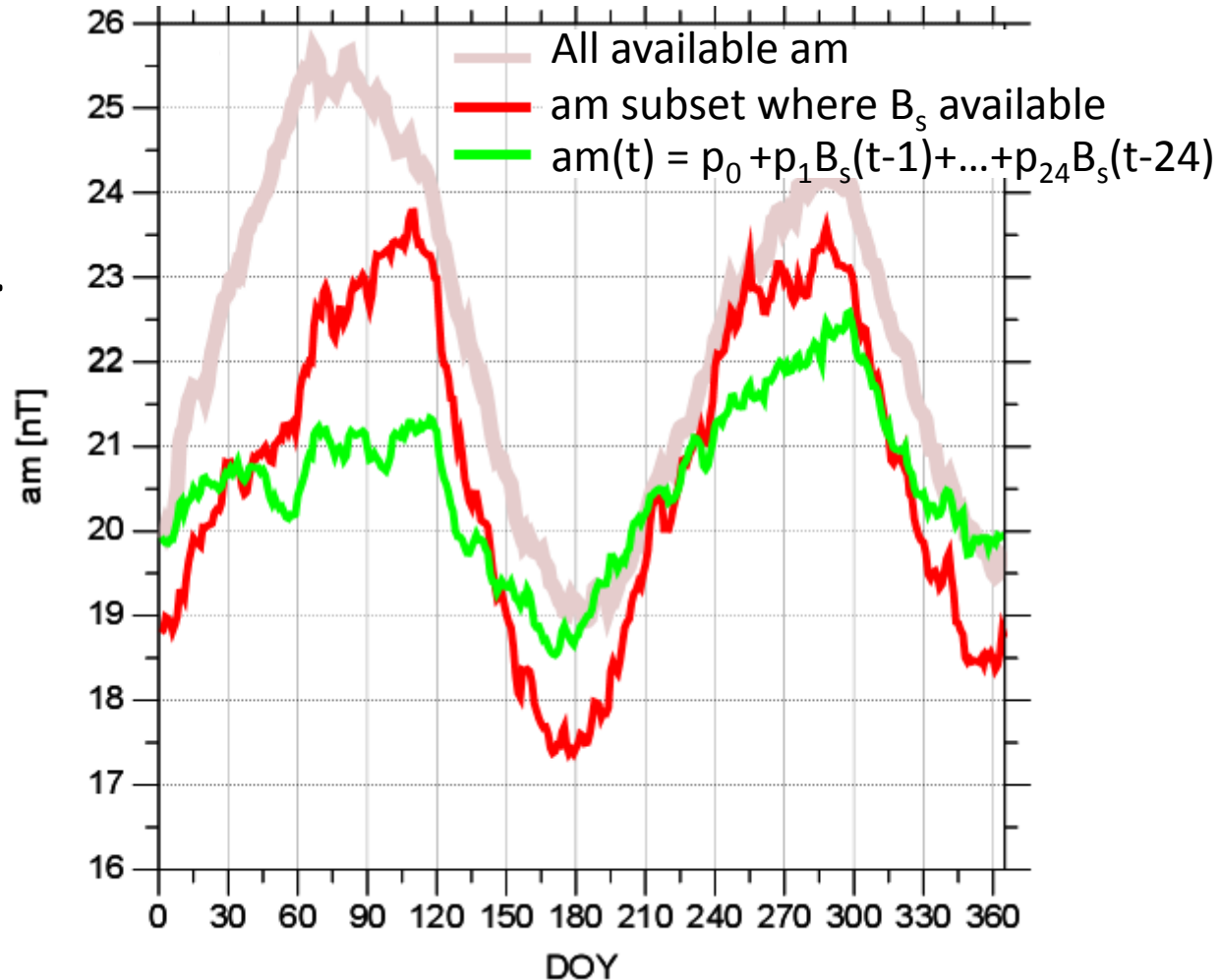
$$\text{3-hour average of geomagnetic index} = \text{3-hour average of } Bs$$

Is remaining 66% explained by

- Change in reconnection efficiency?
- Conductance effects?

Model shows new mode less significant

~66% of variation explained when time history of B_s is included.
~75% when solar wind velocity is included



In auroral zone, result is 50% of semiannual variation is explained by solar wind (up from 0%)