22 years of SOHO/SWAN observations: Two cycles of solar wind flux latitude distribution

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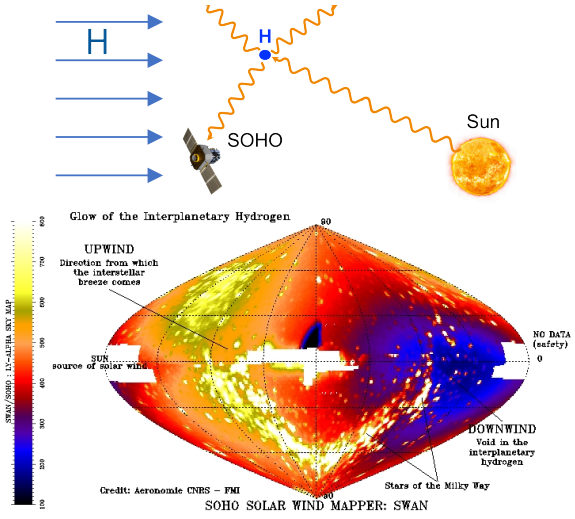
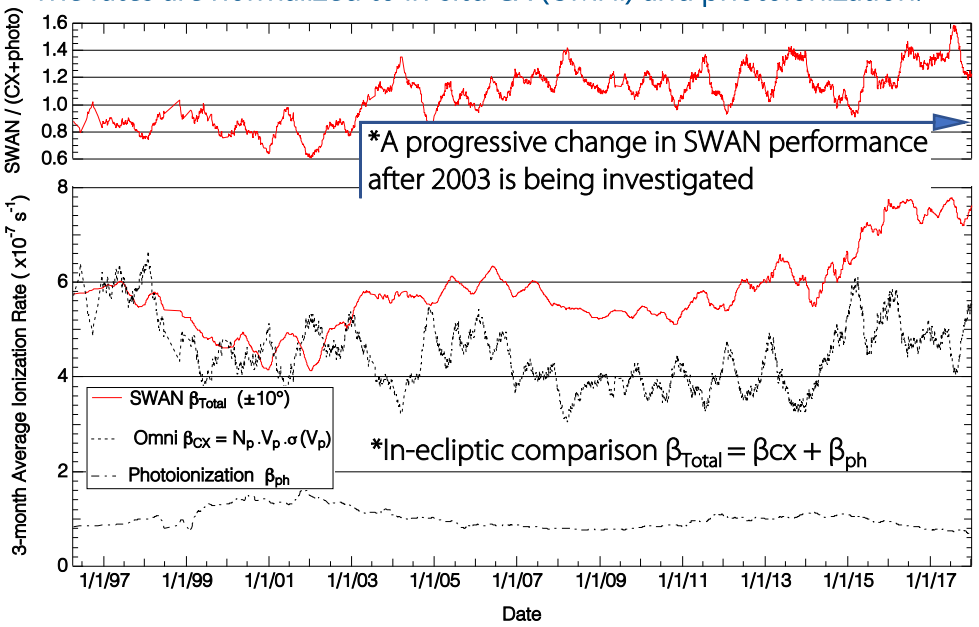
Context: Interstellar H atoms seeping through the Heliosphere in interplanetary space diffuse the solar Lyman-α photons



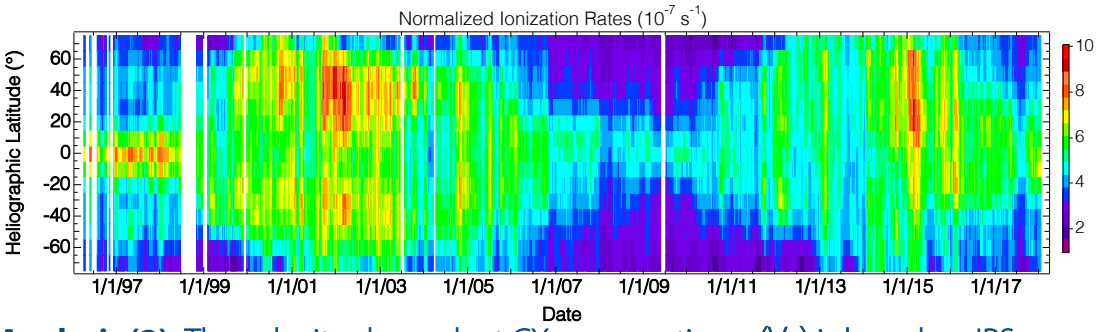
Data: SWAN full-sky maps of the backscattered solar Lyman-α radiation.

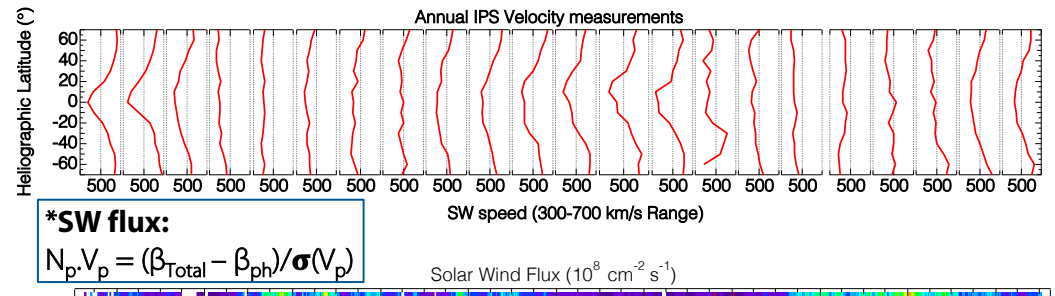
The maps reflect the radiation pressure and ionization (proton charge exchange - CX, photoionization) effects on the interplanetary H distribution, **allowing to monitor the solar wind flux at all heliographic latitudes.**

Analysis (1): An inversion model calculates the total ionization rate for H at all heliographic latitudes for every SWAN map (over 5000 maps). The rates are normalized to in-situ CX (OMNI) and photoionization.

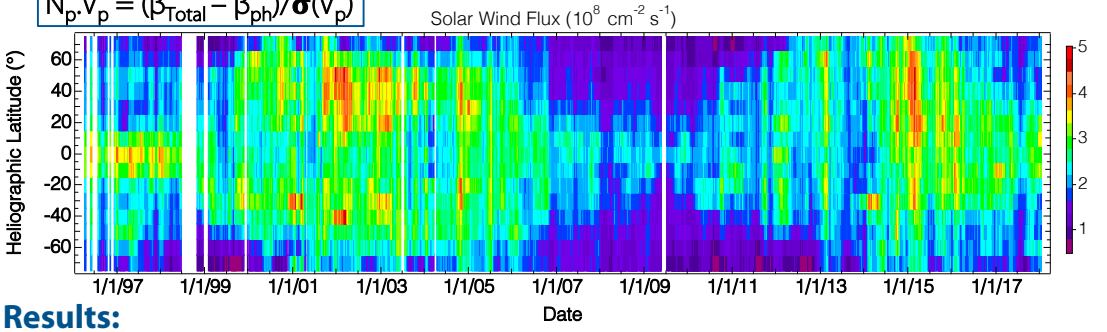


Analysis (2): The velocity-dependant CX cross section $\sigma(V_p)$ is based on IPS (InterPlanetary Scintillation) data from Nagoya U. providing velocities at all latitudes.





***SW flux:**
$N_p.V_p = (\beta_{Total} - \beta_{ph})/\sigma(V_p)$



Results:

-SW flux peaks a year or two after the SC maximum defined on sunspot number

-SC-24 solar activity is globally lower than SC-23, and the SC-24 solar minimum (2008) has a much broader equatorial zone with lower SW flux than the SC-23 minimum (1997), confirming previous independent studies (McComas et al. 2008, GRL 35, L18103; Manoharan et al. 2012, ApJ 751, 128)

-the double structure observed in the 2002 period disappears in favour of a larger North-South asymetry in 2015