Tibet空気シャワーアレイ / SK による 10TeV宇宙線強度の恒星時日周変動の観測

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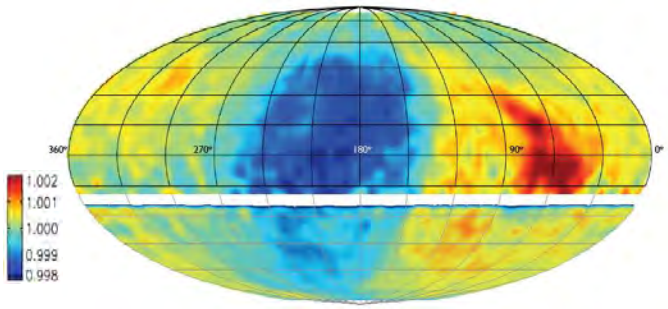
旅費（松本⇔柏）：150千円

- Heliospheric distortion model
- Steady sub-TeV anisotropy
- MHD heliosphere by Washimi

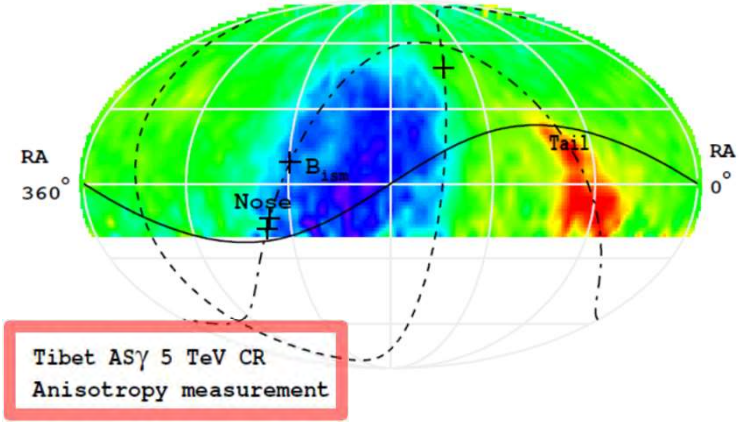


Tibet ASγ (7 TeV)
(Amenomori et al., Science, 314, 2006)

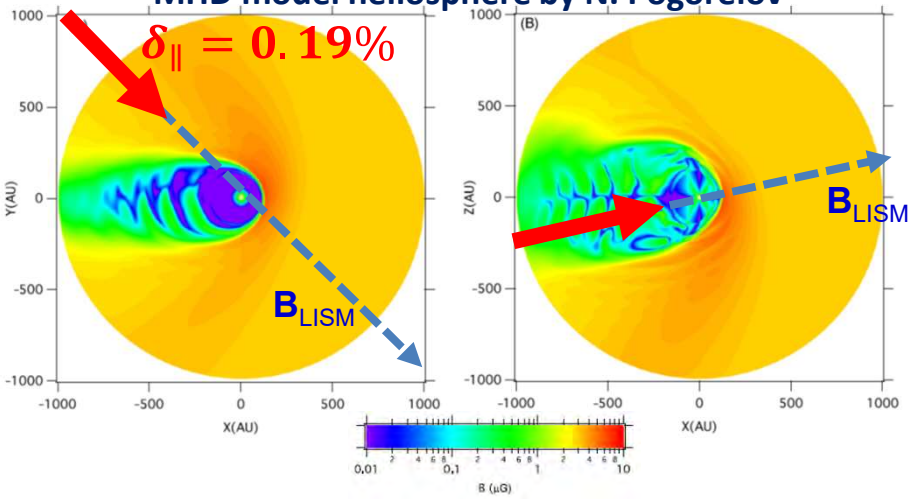
Ice Cube (20 TeV)
(Abbasi et al., arXiv:1005.2960v1, 2010)

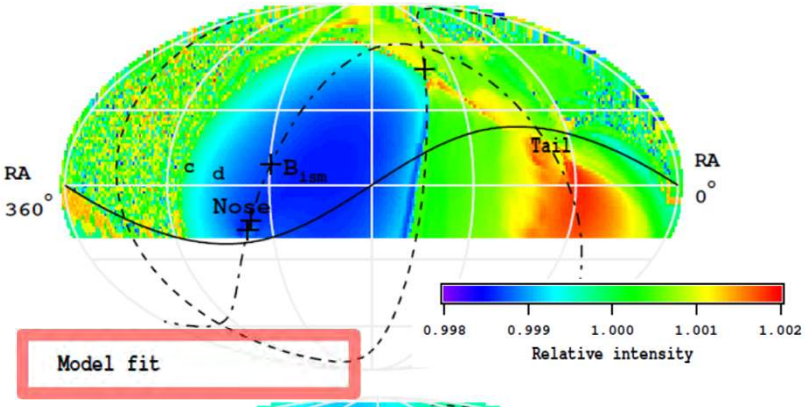
Heliospheric distortion model

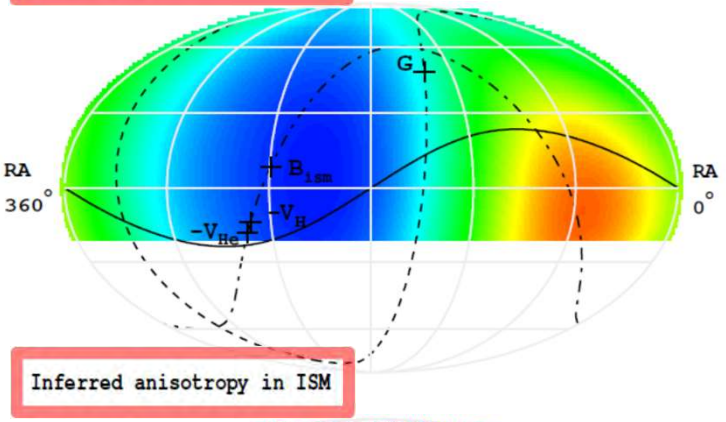
M. Zhang (J. of Physics conf. ser. 767 012027 2016)

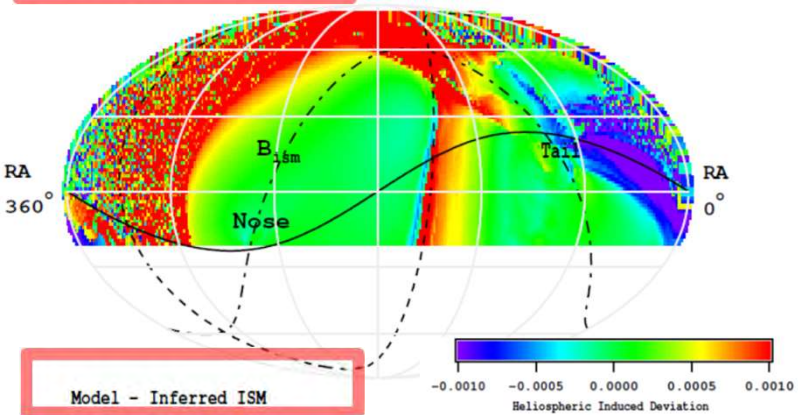


MHD model heliosphere by N. Pogorelov





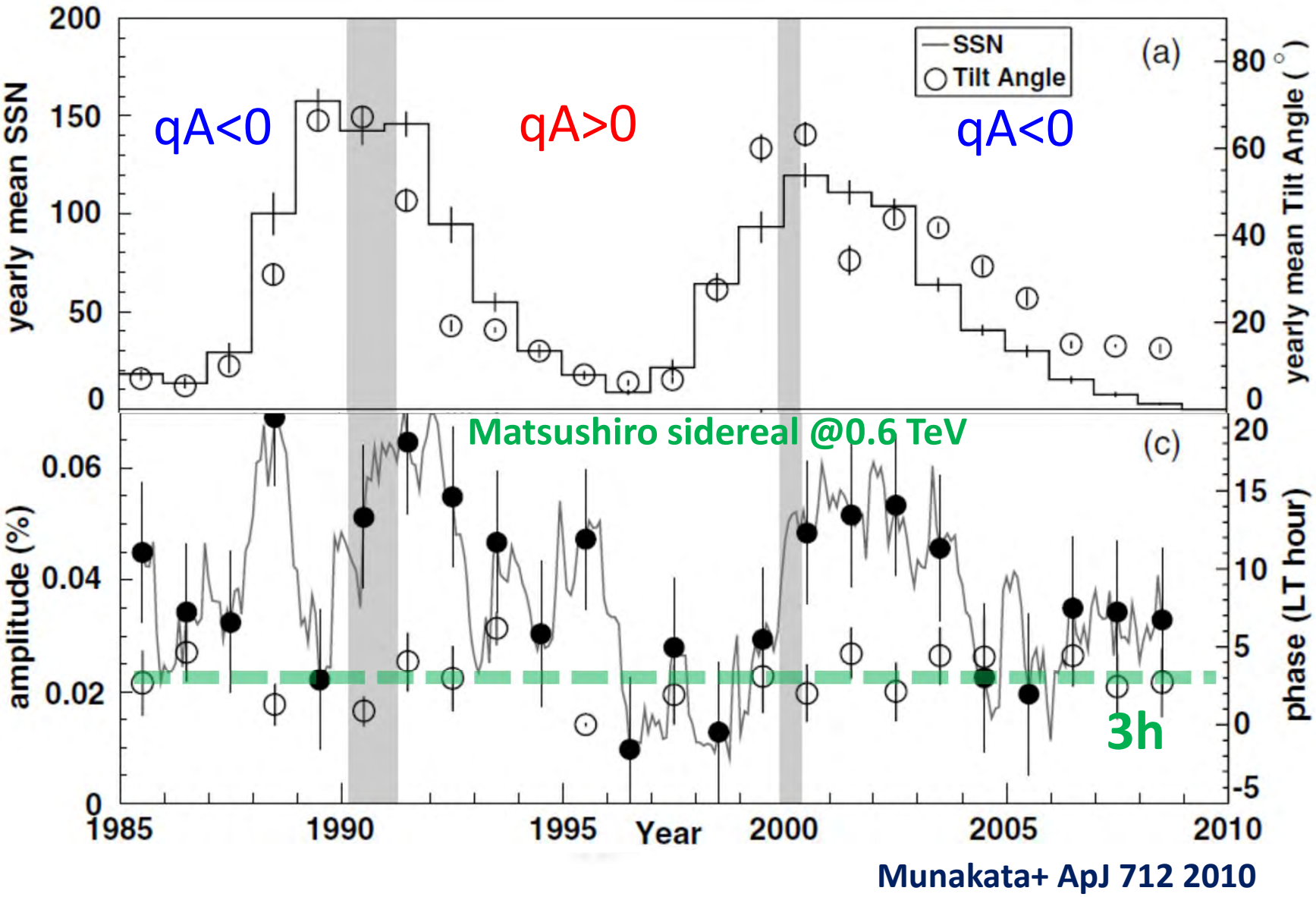




Observed features is reproduced by…

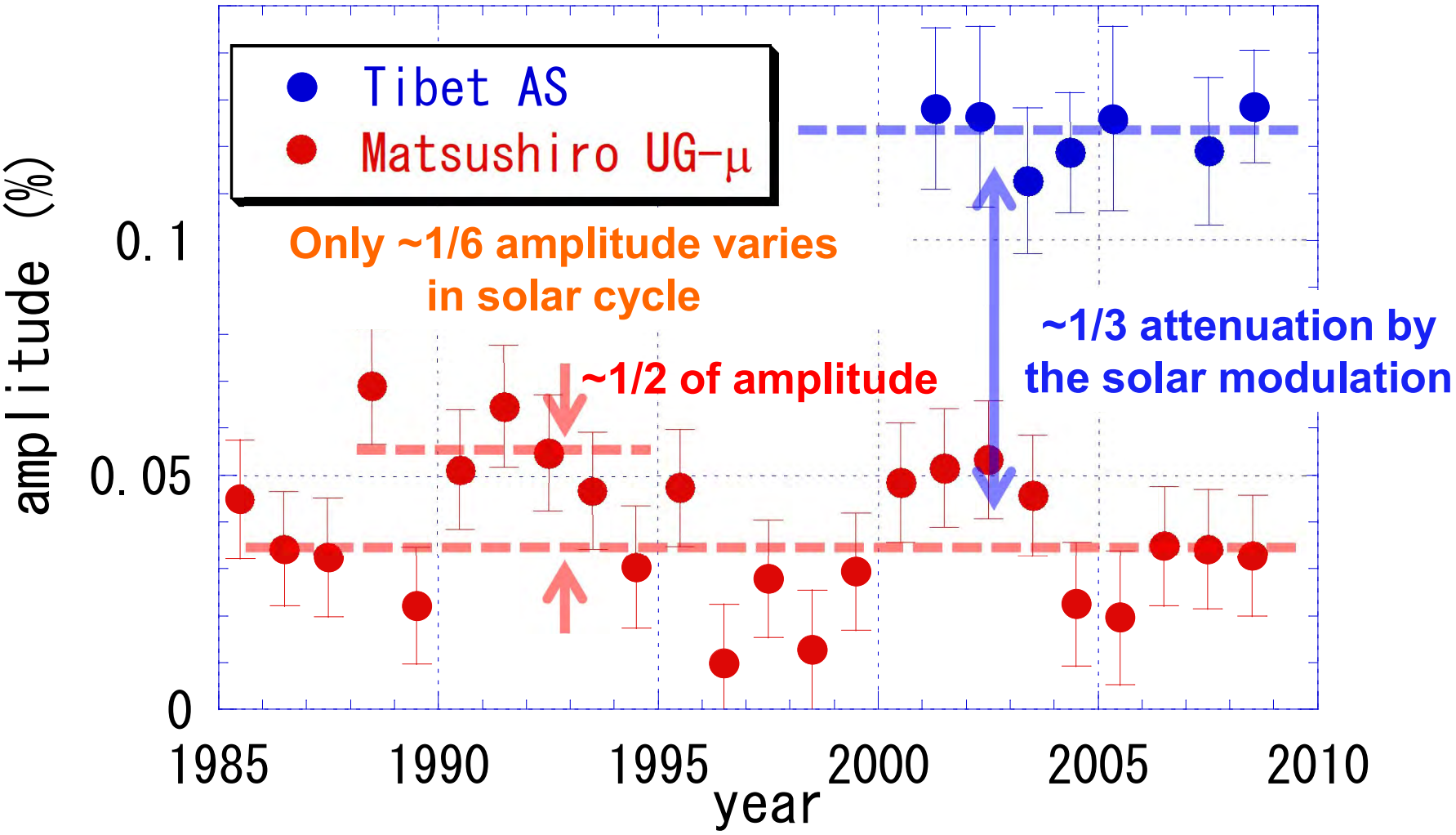
- $\delta_{\parallel}$ + heliospheric distortion
- CR "ring" along the B_{LISM} equator

“Insignificant” dependence on qA sign

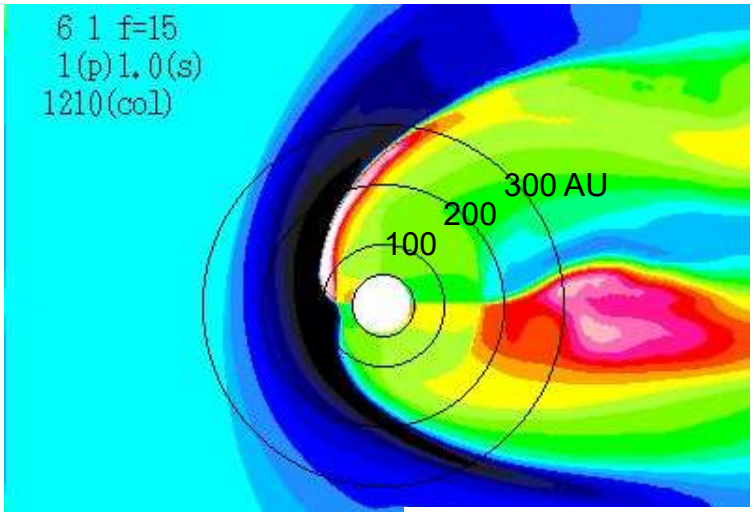


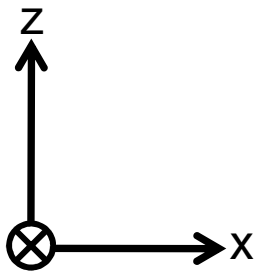
Munakata+ ApJ 712 2010

Small solar cycle variation (if any)

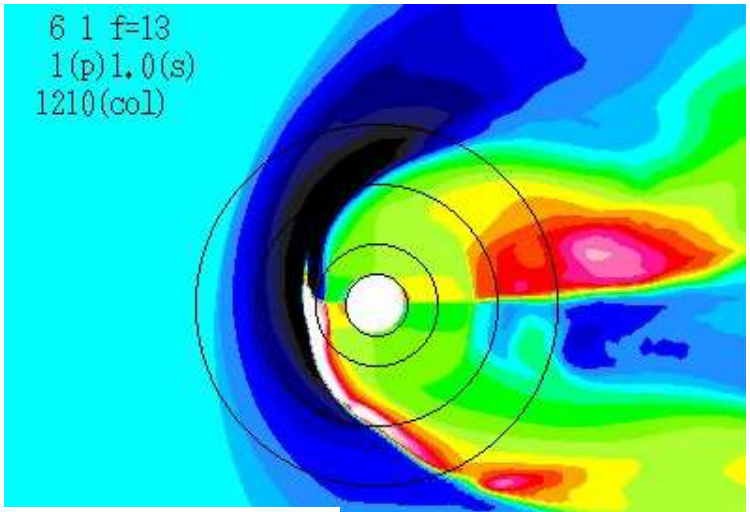


MHD model heliosphere (Washimi & Tanaka)



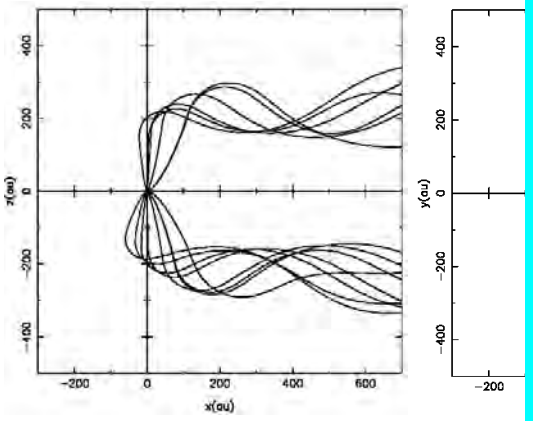


By

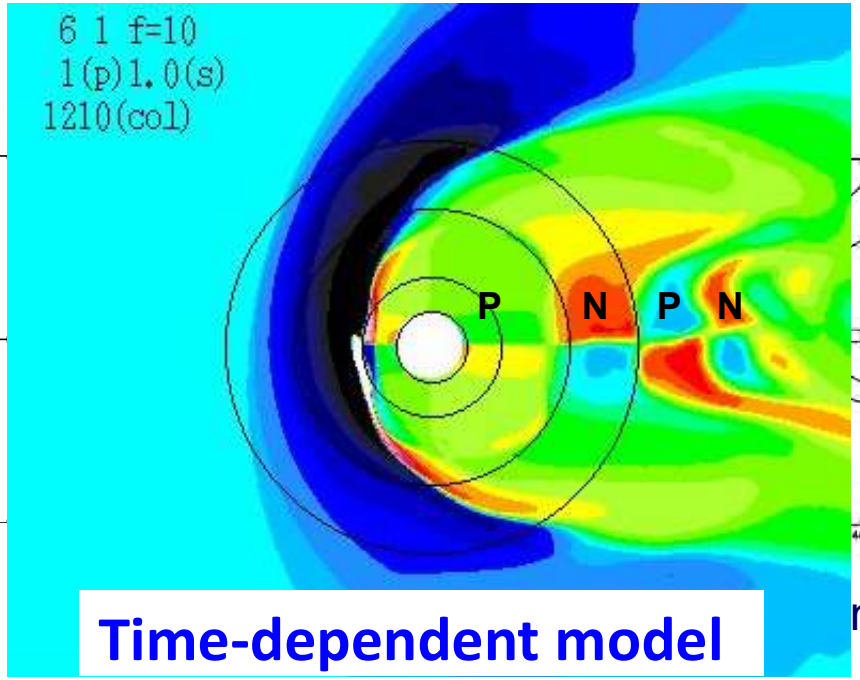


Stationary model with single polarity

qA>0

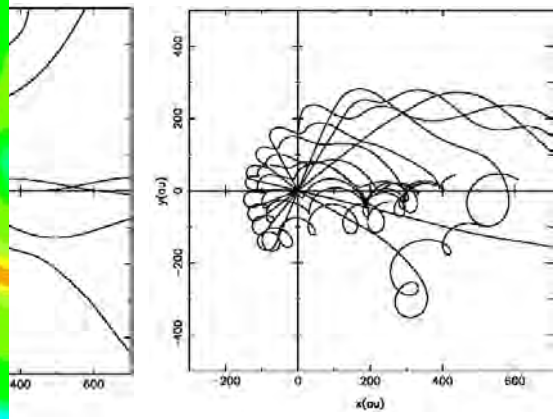


(meridian)



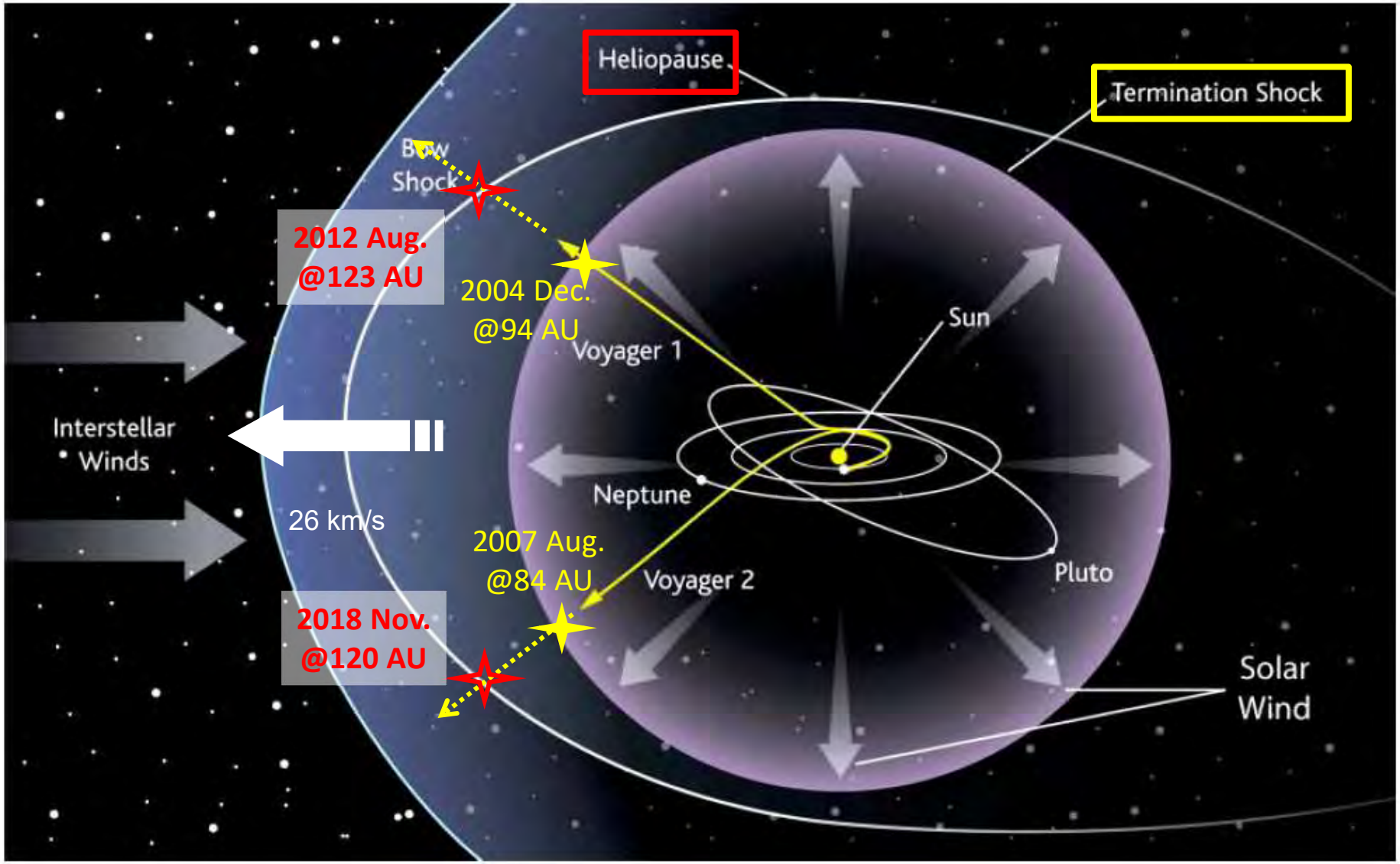
Time-dependent model

qA<0



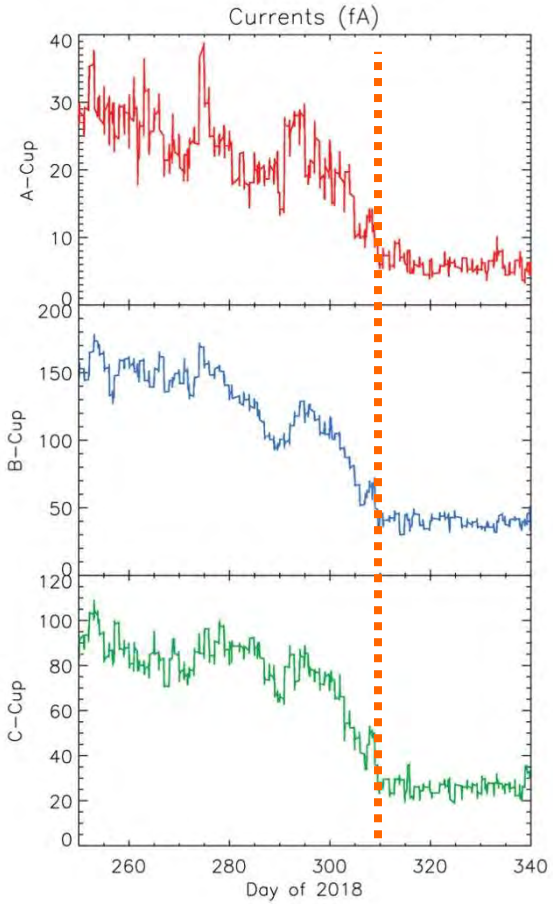
(equatorial)

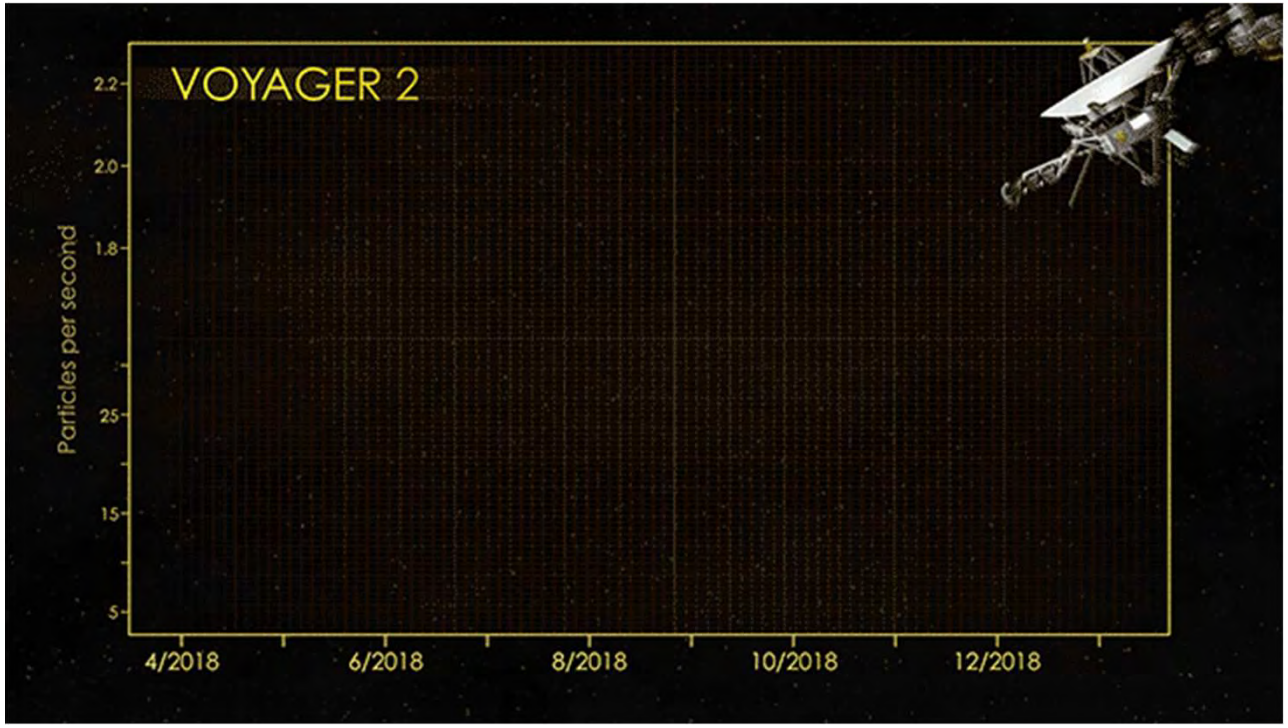
Voyager 1/2 have passed the heliopause



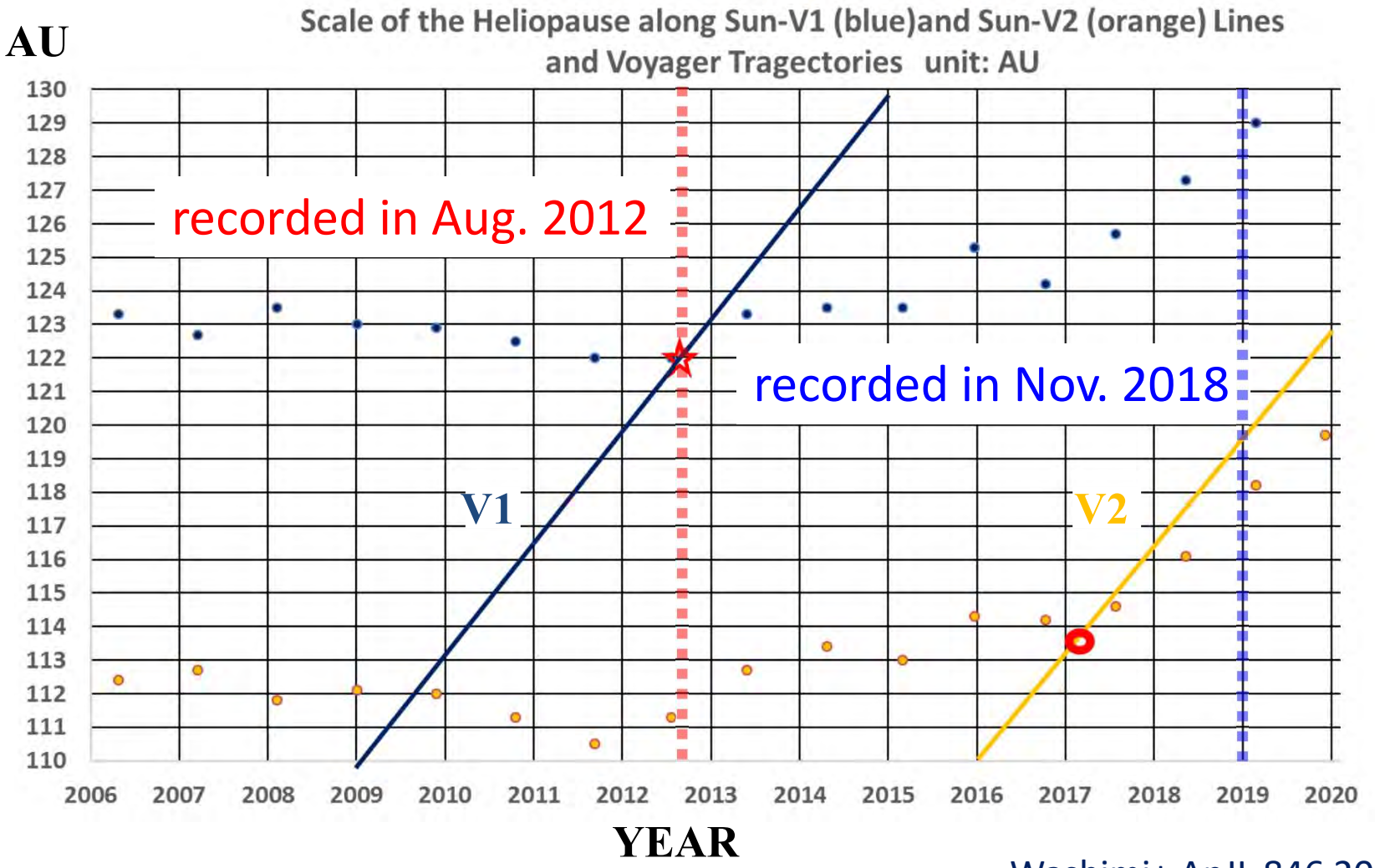
NASA press release (Dec. 10 2018)

https://www.nasa.gov/press-release/nasa-s-voyager-2-probe-enters-interstellar-space





Time-varying heliospheric distance to the heliopause



Washimi+ ApJL 846 2017

E-dependent anisotropy by Tibet ASγ

Amenomori+ ApJ 836 2017

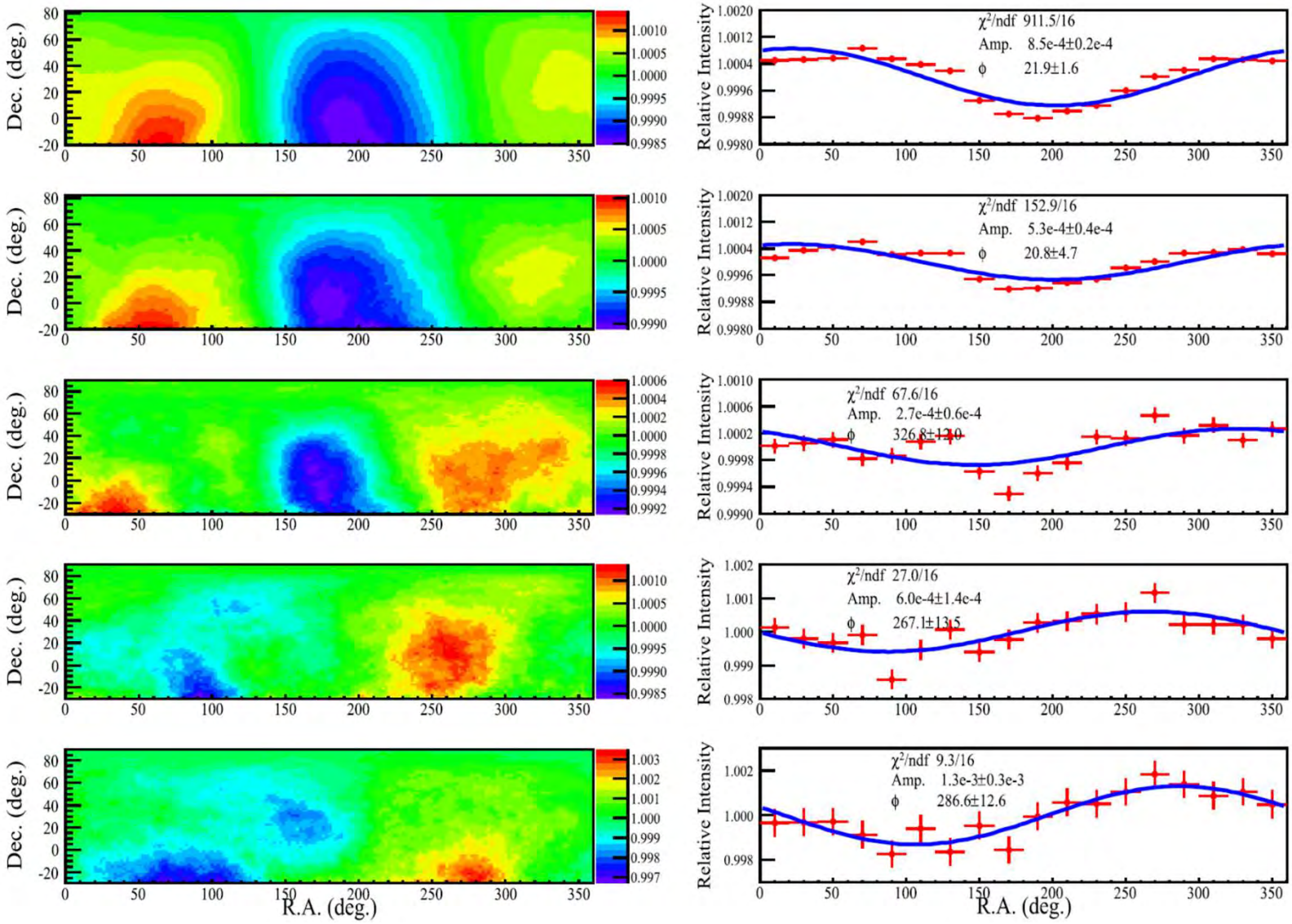
15 TeV

50

100

300

1000



Observed Dipole Amplitude and Phase