Sidereal daily variation of ~10TeV GCR intensity observed by the **Super-Kamiokande/Tibet AS array**

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旅費（松本⇔柏）：100千円（SK）/ 100千円（Tibet）

- **Modeling the large-scale anisotropy with Global Anisotropy (GA) and Additional Excess (AE).**

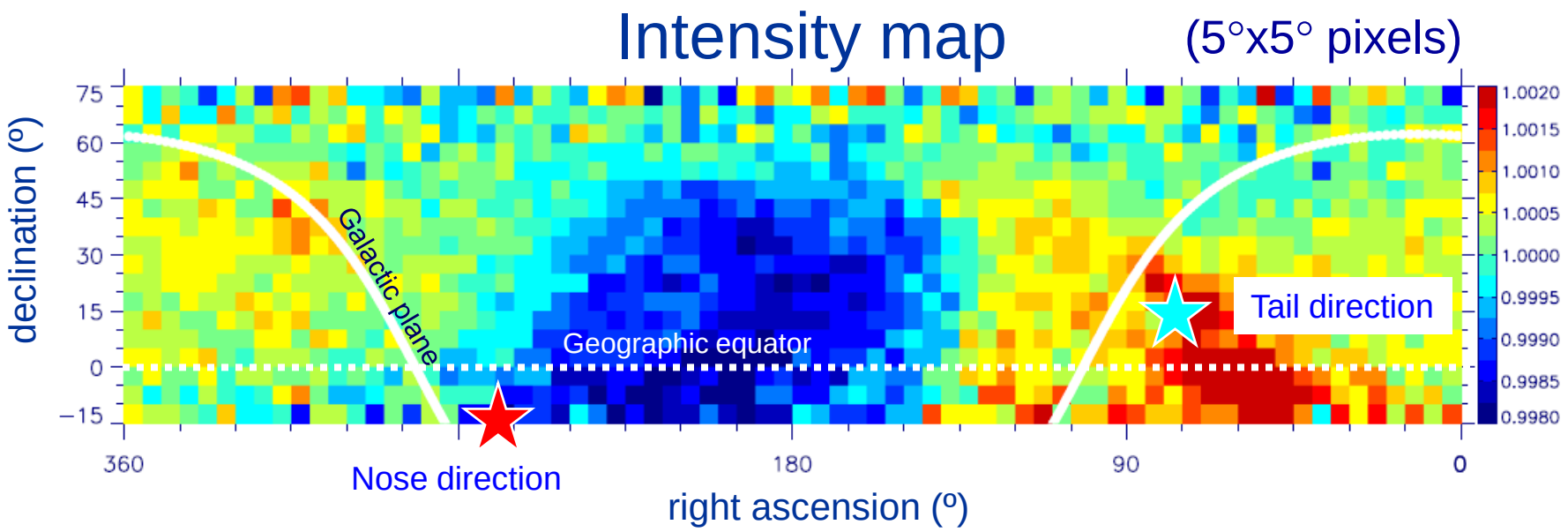
  ⇒ **Amenomori et al., Proc. 31st ICRC, 2009.**

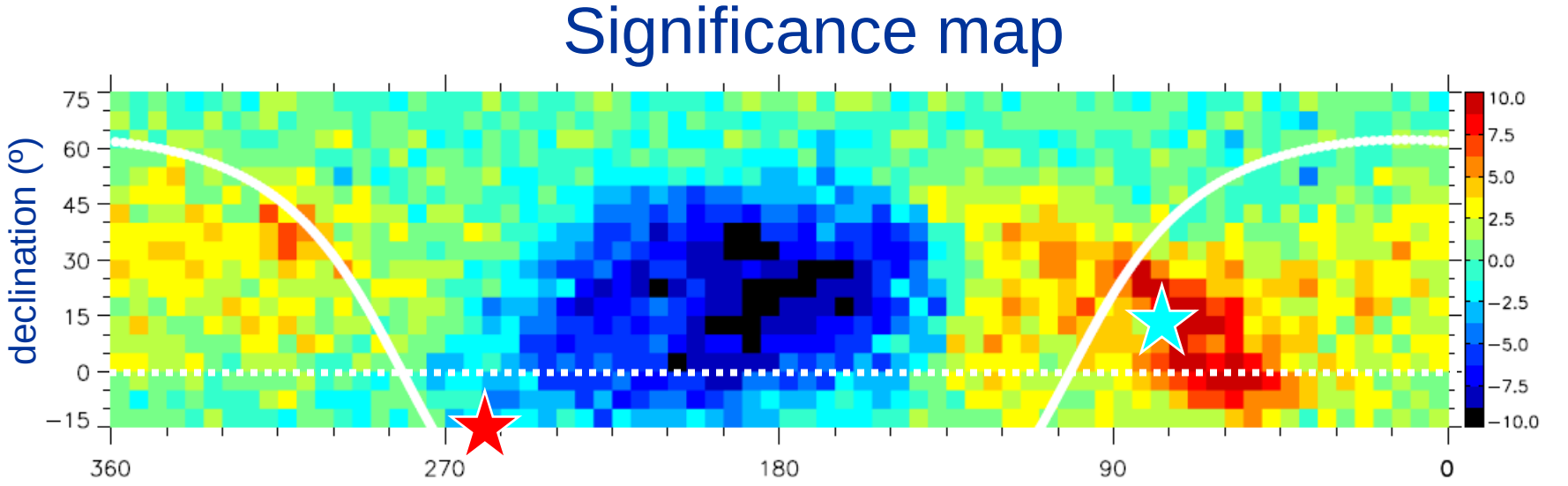
- **Solar cycle dependence of the diurnal anisotropy observed with the Matsushiro UG-μ detector.**

  ⇒ **Munakata et al., ApJ, submitted.**

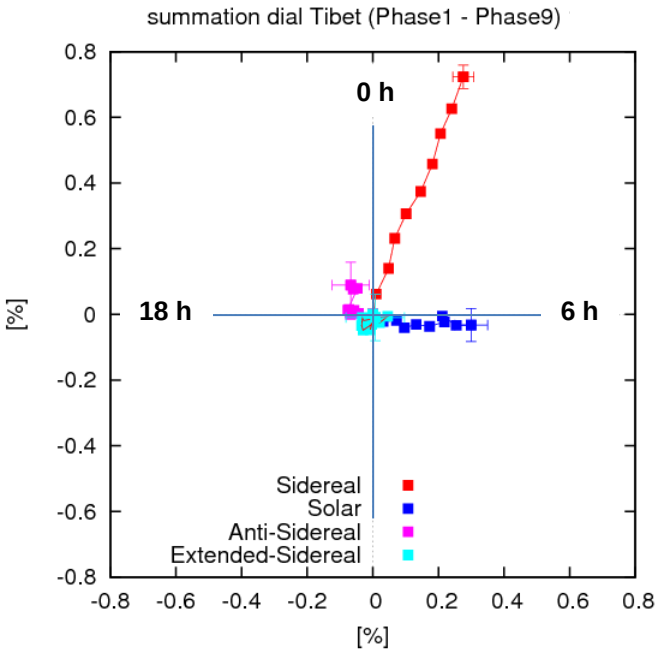
2D sky map of CR intensity by Tibet ASγ

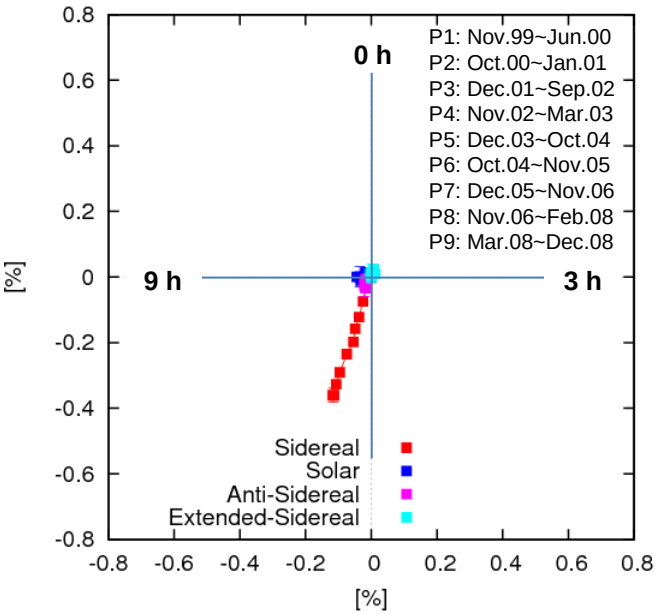
6 years data in Nov.1999-Oct.2005 (Amenomori et al., *Science*, **314**, 2006)



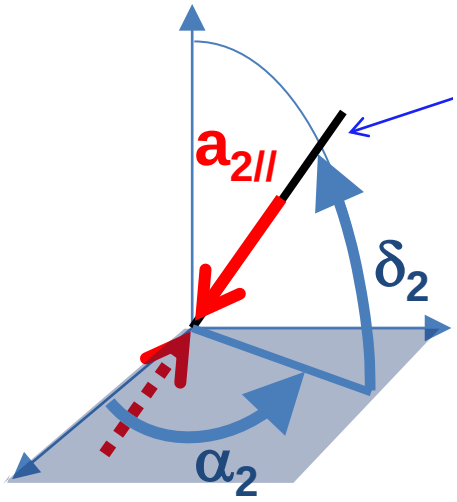


Global Anisotropy model (GA)

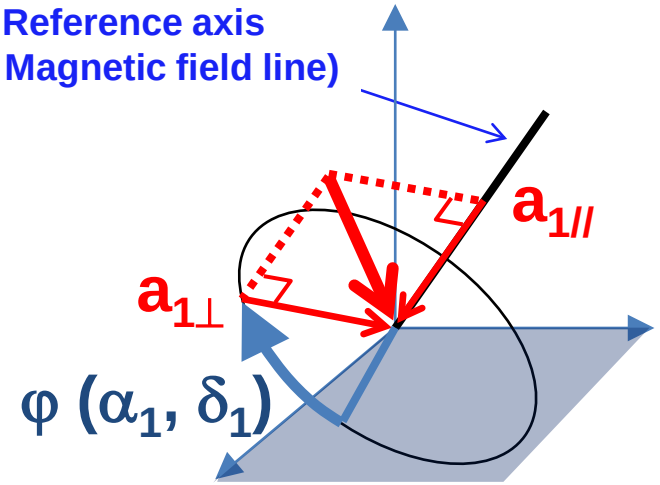


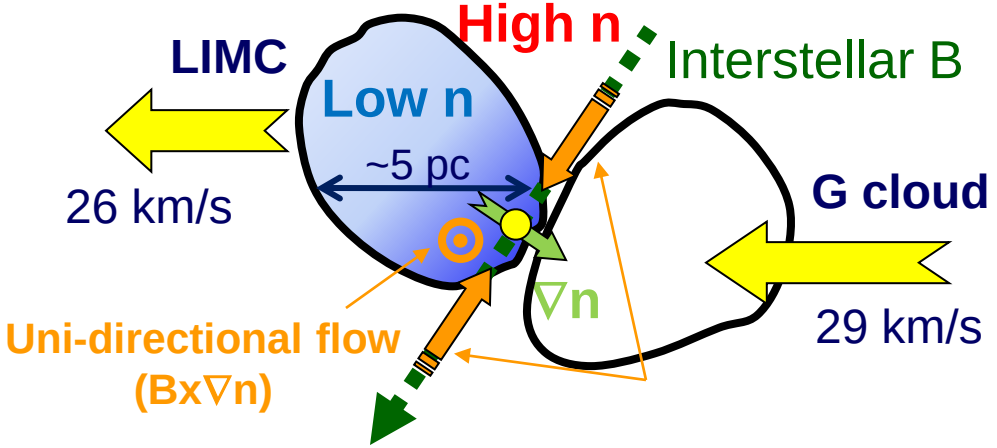


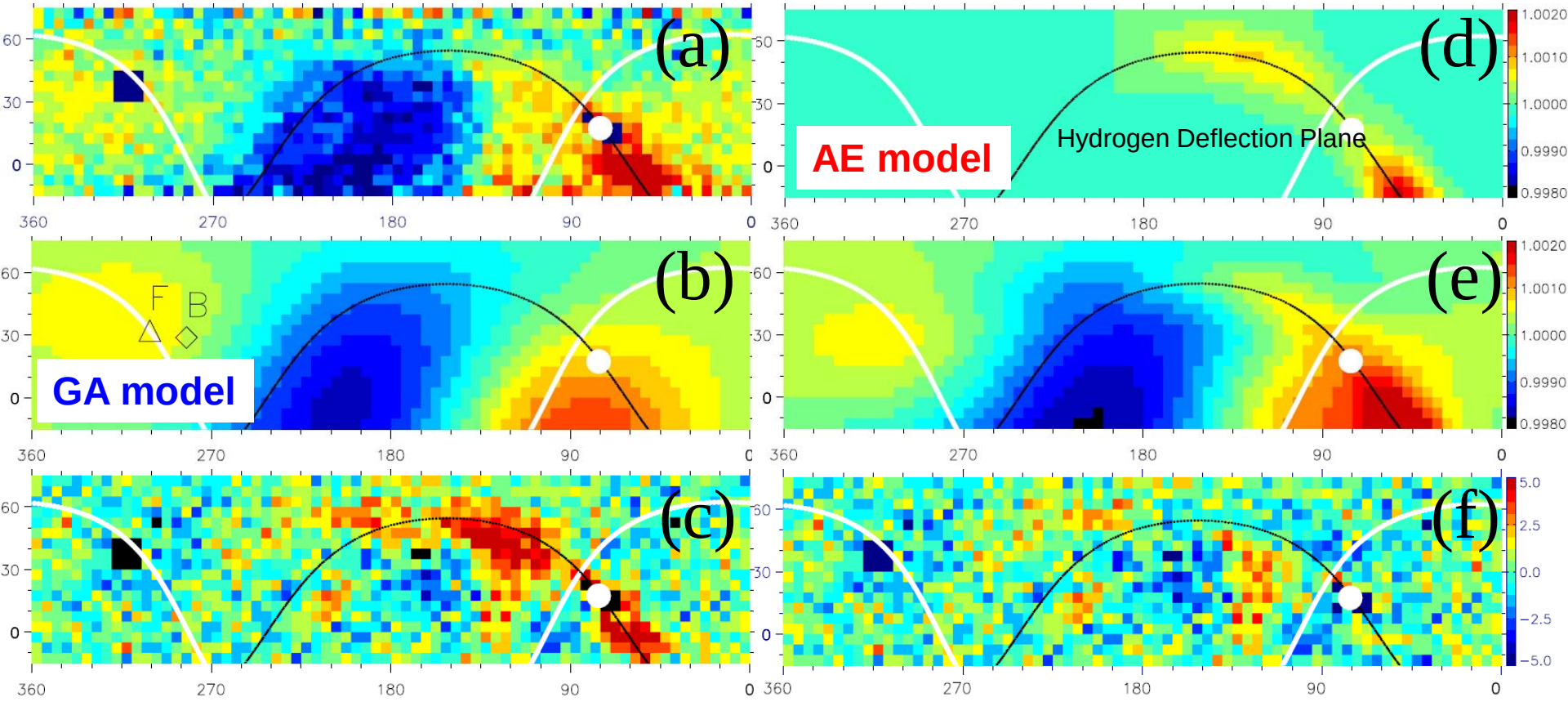
Bi-Directional Flow (BDF)



Uni-Directional Flow (UDF)







Best-fit parameters

GA:

$a_{1//}$ (%)	$a_{1\perp}$ (%)	$a_{2//}$ (%)	$\alpha_{1\perp}$ (°)	$\delta_{1\perp}$ (°)	$\alpha_{2//}$ (°)	$\delta_{2//}$ (°)
0.006	0.141	0.140	37.5	37.5	102.5 (120.9)	-28.9 (-32.2)

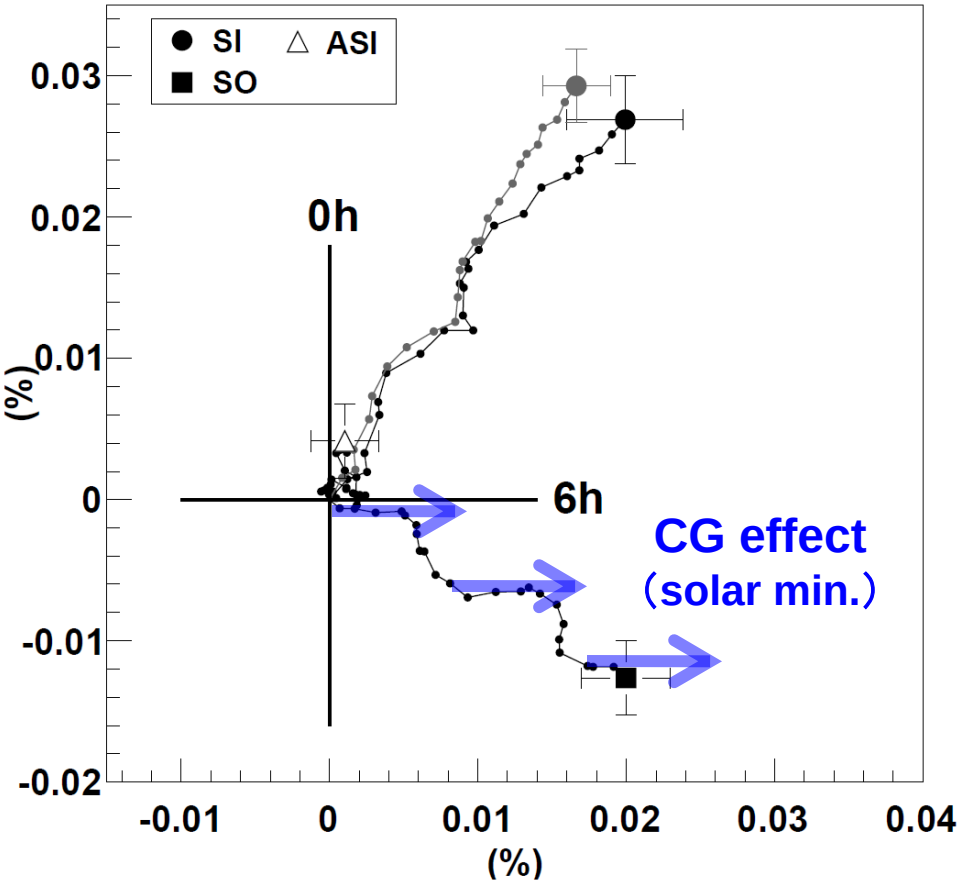
(**Frisch's B**)

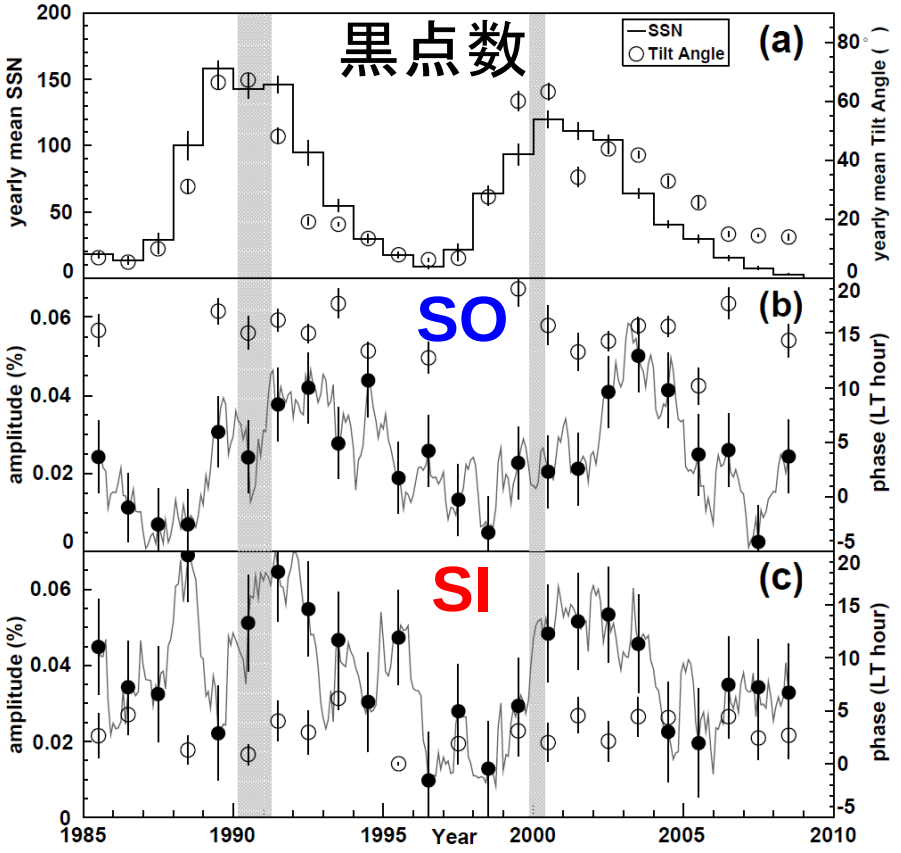
AE:

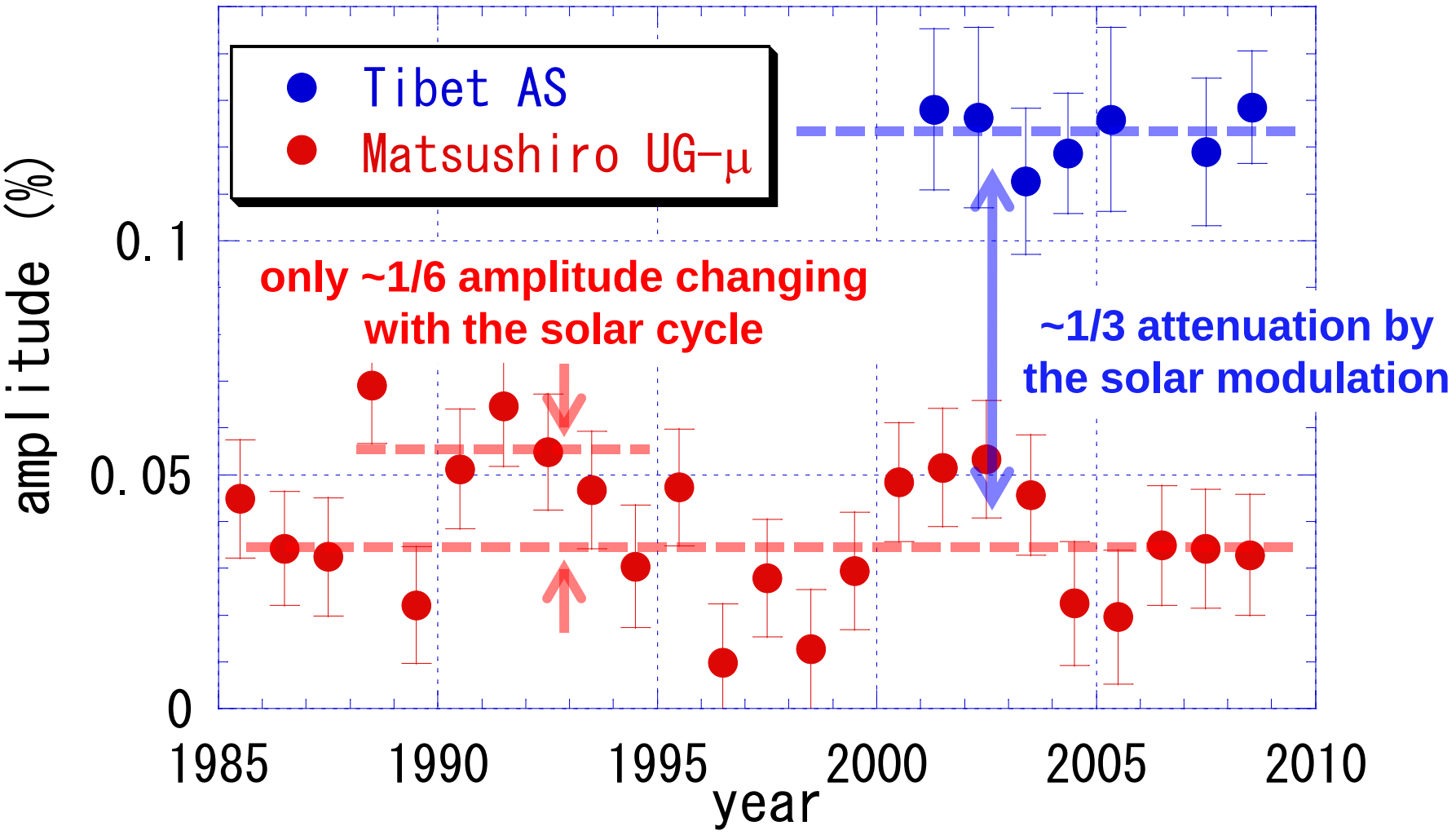
b_1 (%)	b_2 (%)	$\sigma_{//}$ (°)	$\sigma_{\perp}$ (°)	Φ (°)
0.234	0.100	25.0	10.0	52.5

Solar cycle dependence of 0.6 TeV GCR anisotropy

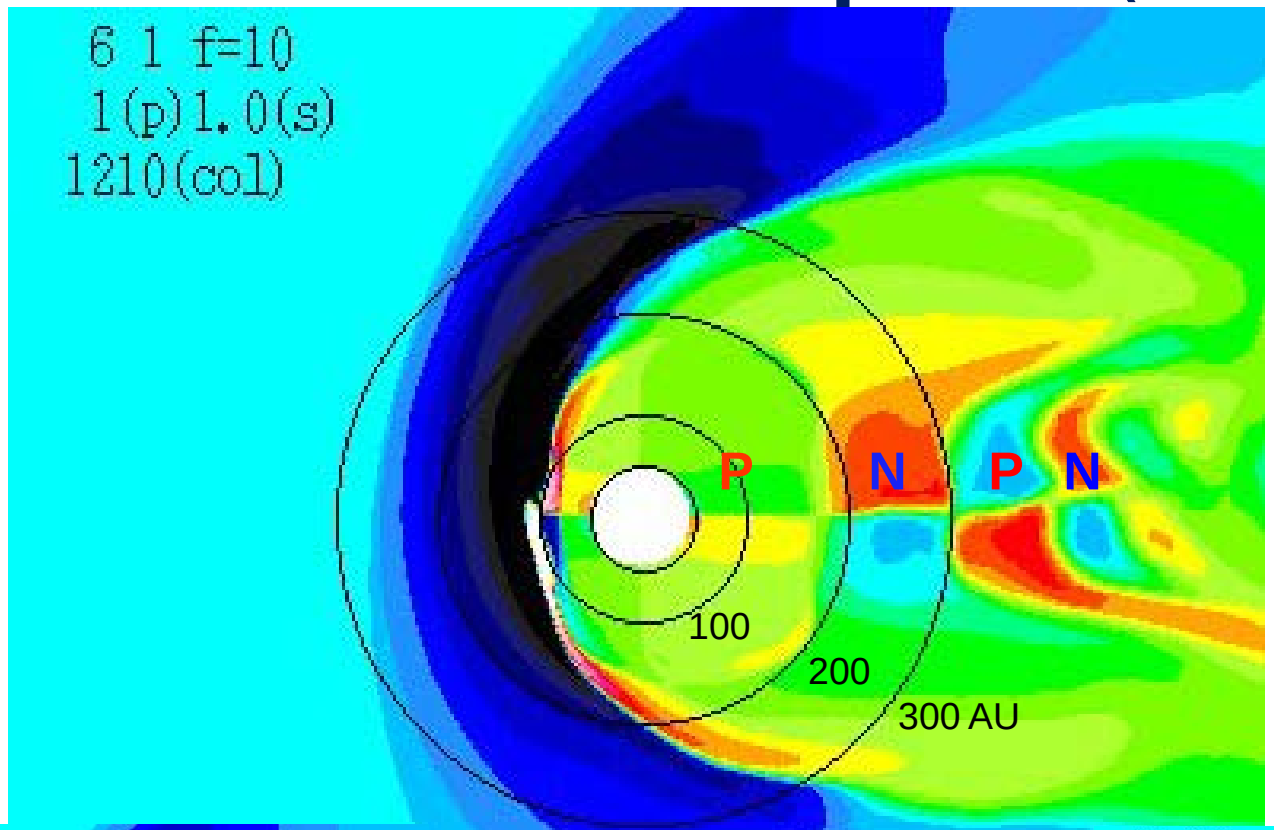
(by Matsushiro UG-μ detector in 1985-2008)



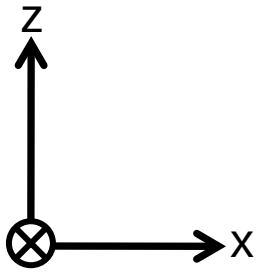


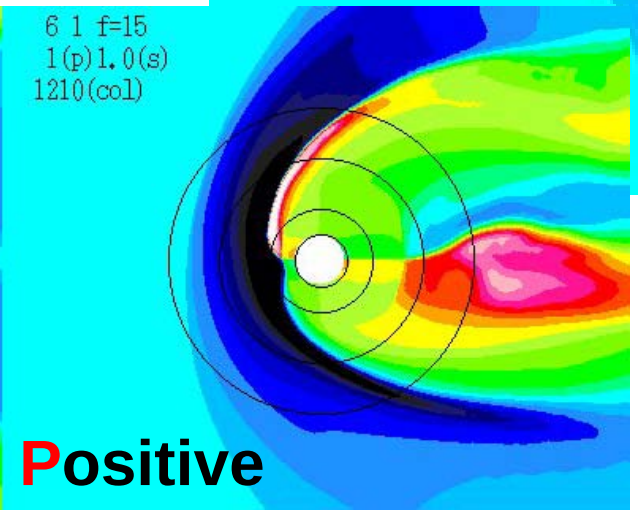

Tibet AS
Matsushiro UG-μ
only ~1/6 amplitude changing
with the solar cycle
~1/3 attenuation by
the solar modulation
amplitude (%)
0.1
0.05
0
1985
1990
1995
2000
2005
2010
year

MHD model heliosphere (Washimi & Tanaka)

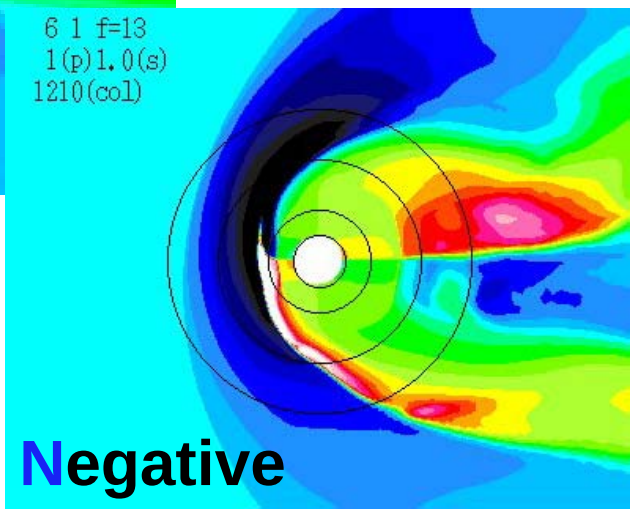


By





Positive



Negative

Summary

- GA+AE model developed for the 2D-map observed by Tibet III AS-array suggests…
  - GCR propagation in the **local structure** needed for a large density gradient.
  - **LISMF almost lays in the galactic plane.**
  - **Modulation in the heliotail (AE along HDP)**.
- The average amplitude @0.6 TeV is roughly one third of the amplitude in multi-TeV region.
- **Only one fourth of the total attenuation varies in a correlation with the solar activity cycle and/or the solar magnetic cycle.**