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

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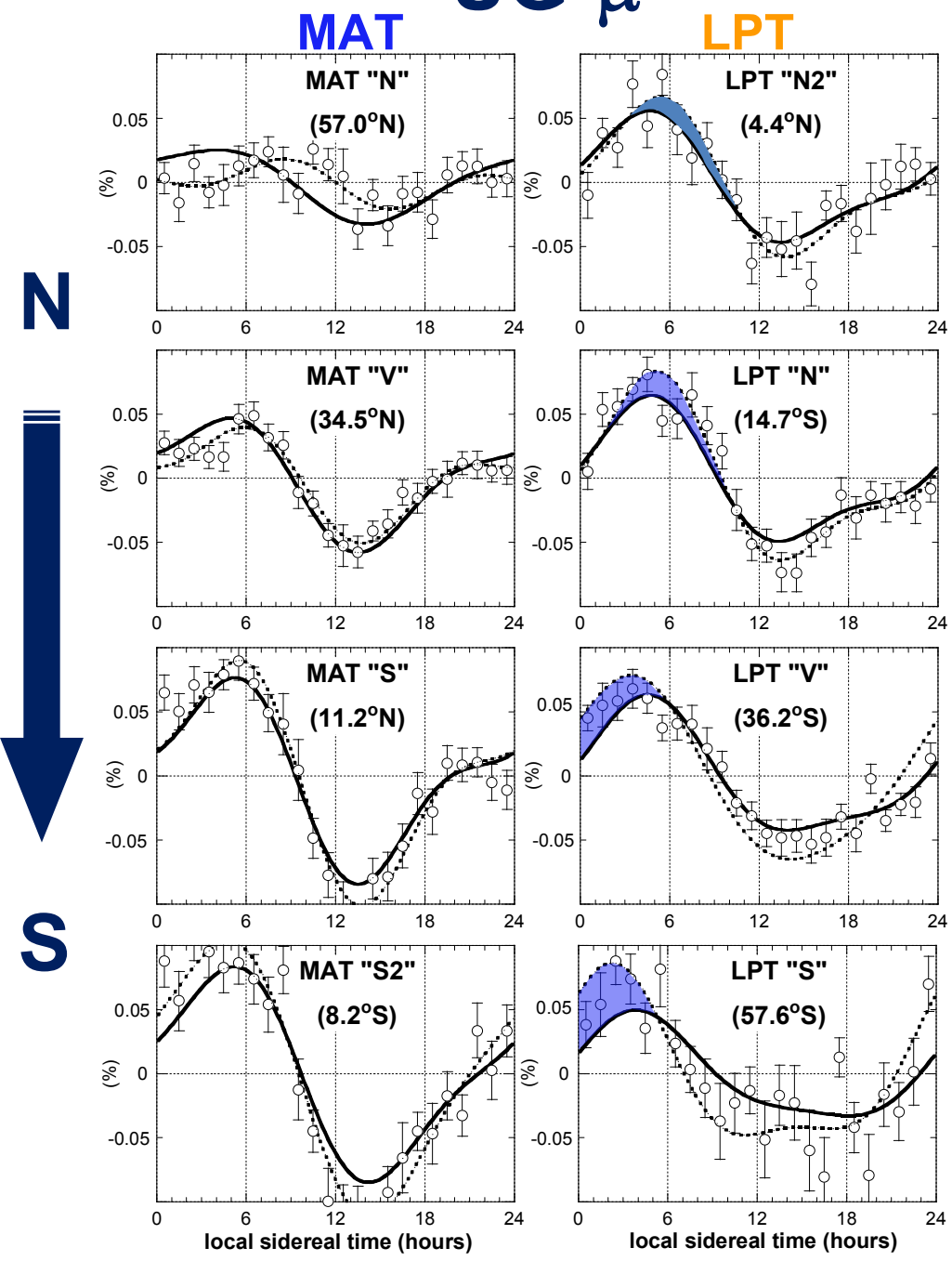
旅費（松本⇔柏）：30千円（SK）/ 100千円（Tibet）

- **Modeling the large-scale anisotropy in terms of the local interstellar magnetic structures.**

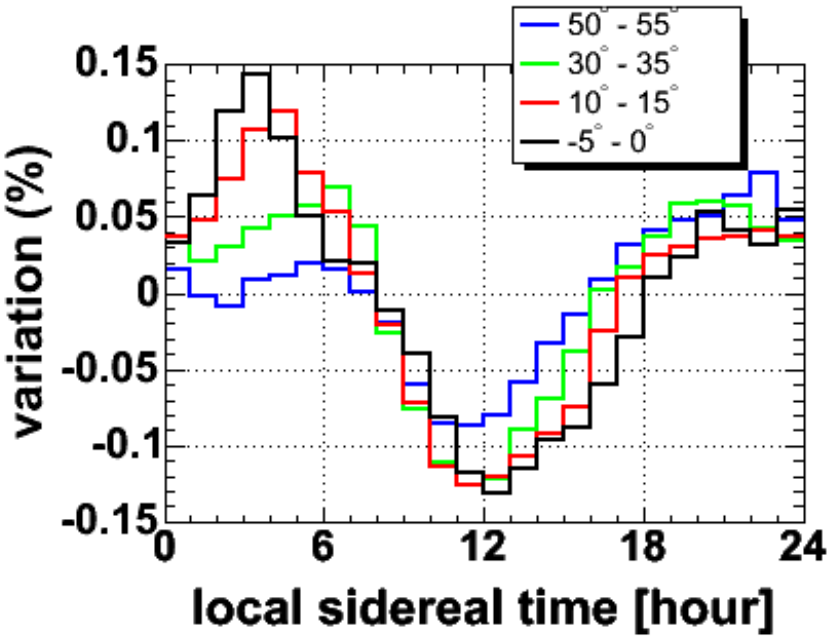
  ⇒ **Amenomori et al., AIP conf. Proc., 2007.**
- **Comparison with the sub-TeV anisotropy by the two-hemisphere observations using UG-μ detectors.**

  ⇒ **Munakata et al., Adv. Geosciences, 2008.**
- **Residual (local) anisotropy and the heliosphere.**
- **Hot spot (s).**

UG-μ



Tibet-AS (E-W)



- "Skewed" feature, first reported from UG-μ obs. @sub-TeV, is fairly consistent with Tibet's result @multi-TeV.

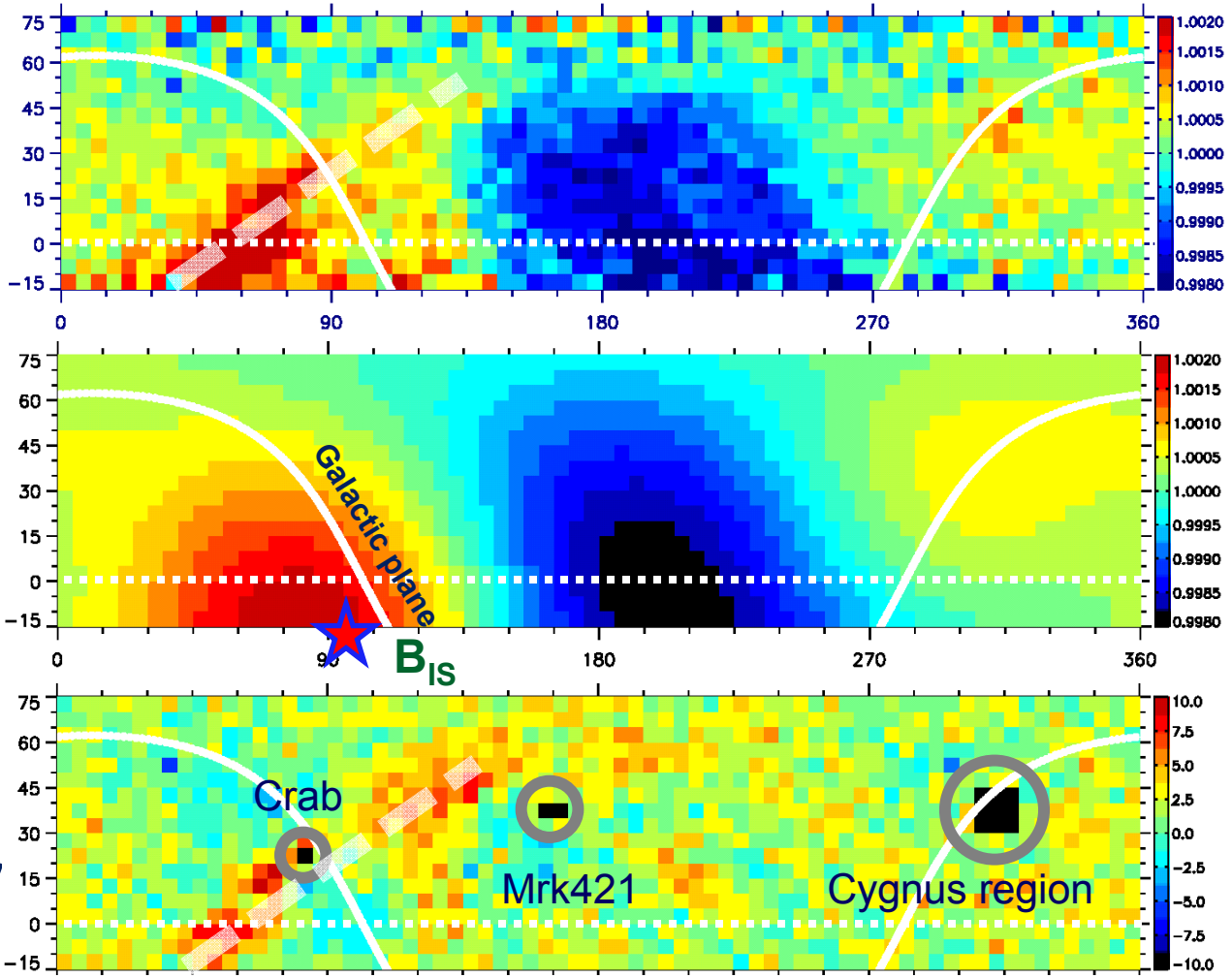
⇒ not γ-ray origin.

Modeling the large-scale anisotropy & the residual

Observed intensity

Best-fit model

Residual (obs.-BF)/error



- **Large-scale feature is well reproduced.**
  ("deficit", "excess" and broad enhancement around Cygnus region)
- **"Skewed" excess needs to be modeled further.** $\Sigma\chi^2$/d.o.f. = **2.493**

Two magnetic planes (containing $\mathbf{B_{IS}}$ & $\mathbf{V_{IS}}$)

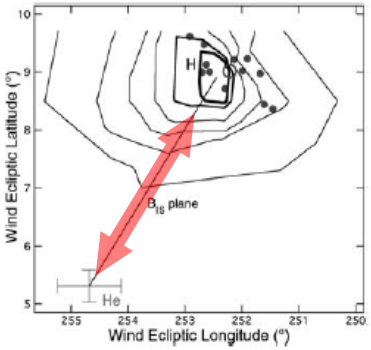


Fig. 2. H flow direction determination. Directions with $\chi^2 = 1.14$ (bold line), 1.16, 1.21, 1.5, and 2.0 from the maximum-absorption location method are shown with solid lines. Dots indicate the series of corrected directions derived from the line profile reconstruction method. The He flow direction and its error bars are shown for comparison. If the deflection is associated with a magnetically distorted heliosphere, the H and He flow directions define the interstellar magnetic field plane.

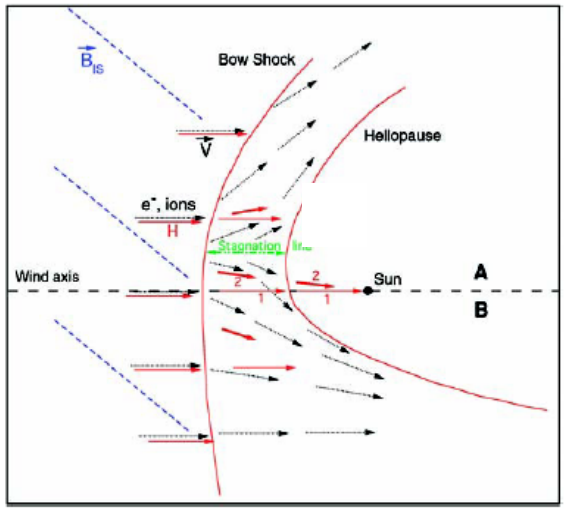
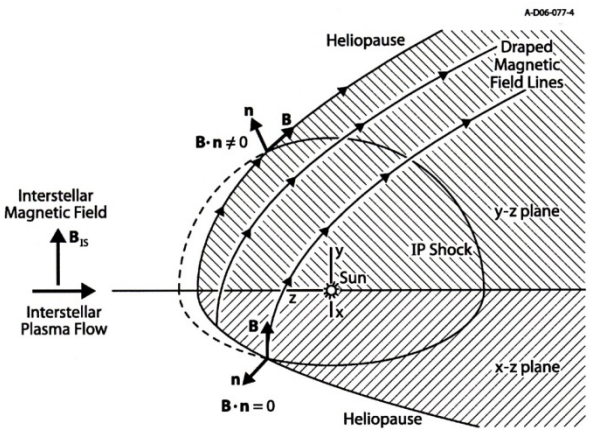


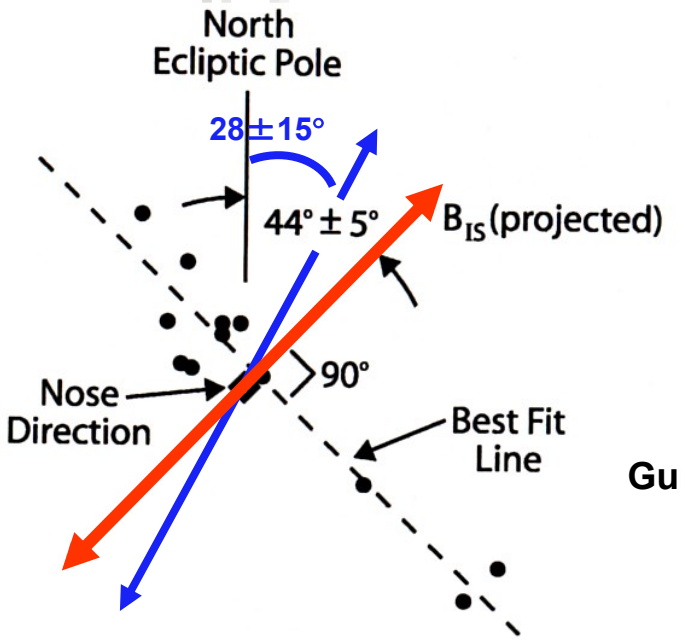
Fig. 3. A schematic view of the heliosphere in the case of a B_{IS} inclined with respect to the flow direction [adapted from (*24*) and (*25*)]. Neutral (red arrows) and plasma (electrons and ions, black arrows) flows are sketched in the plane containing B_{IS} (dashed lines) and the wind flow vector. The secondary flow of H atoms (marked 2) is generated between the bow shock and the heliopause in a region between the Sun-wind axis and the displaced stagnation line (green dashed line). According to such a scheme, the plane containing the primary flow (nondeviated, marked 1) and the secondary flow also contains the magnetic field, and the secondary flow arrival direction lies between the wind axis and the field direction.

Lallement's Hydrogen-Deflection-Plane (HDP)

Velocity difference between H^0 & He^0

Lallement et al. (Science, 307, 2005)

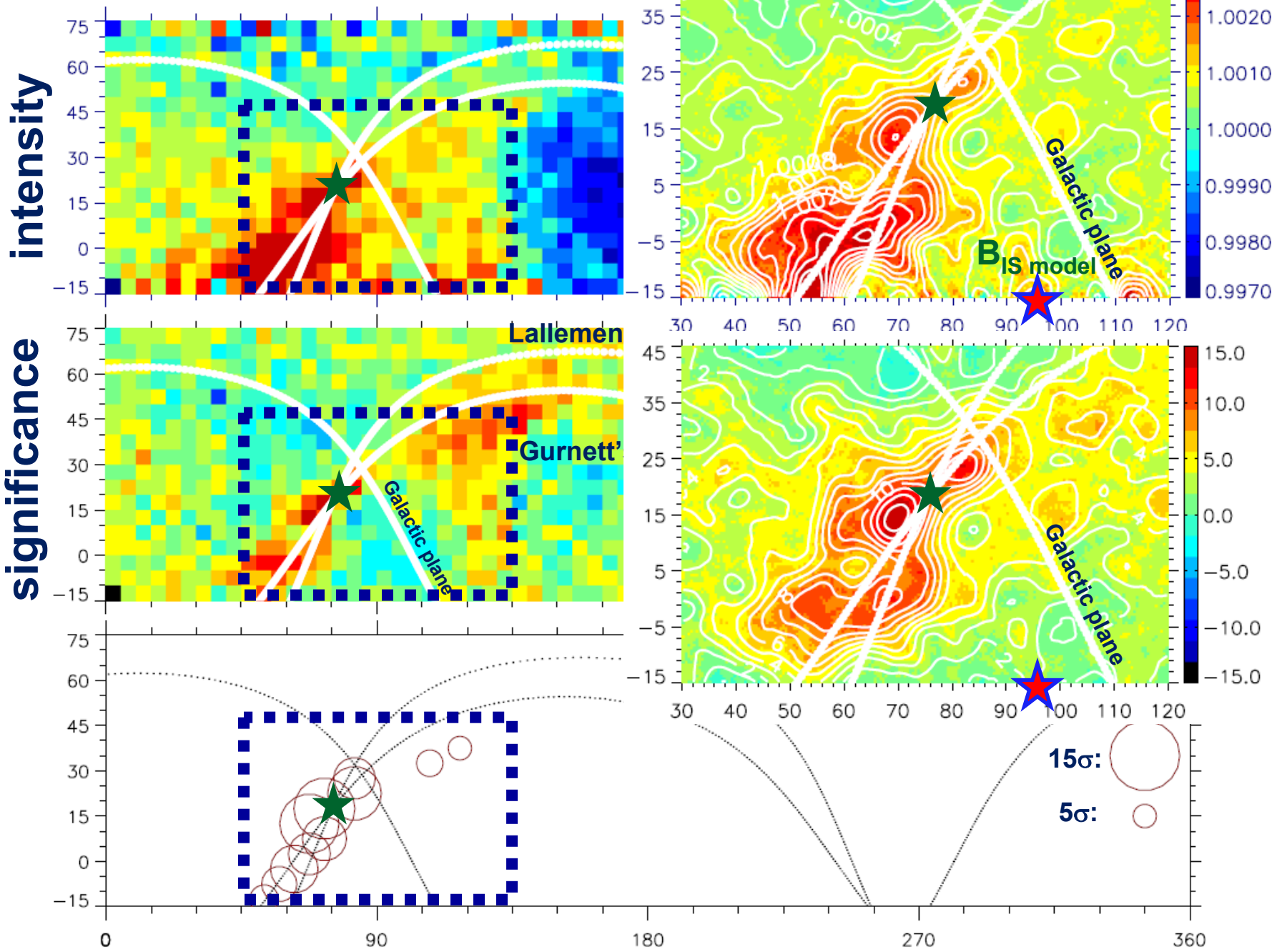




Gurnett's B-Plane

Source direction of 2-3 kHz radio measured by Voyagers

Gurnett et al. (AIP conf. Proc., 2006)


intensity
significance
Lallemen
Gurnett'
Galactic plane
Galactic plane
Galactic plane
B IS model
1.0004
1.0008
15σ:
5σ:
0
90
180
270
360

The heliosphere as seen outside the solar system: Asymmetric! (Opher, 2007)