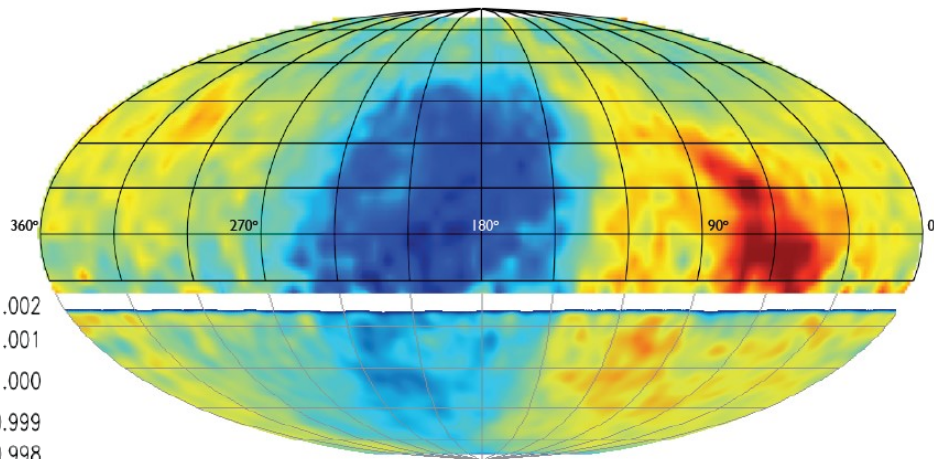


SK/Tibet空気シャワーアレイによる 10 TeV宇宙線強度の恒星時日周変動の観測

宗像一起、加藤千尋、小財正義、中村佳昭、大島貴広、小池俊輝(信州大理)、
瀧田正人(ICRR)

旅費(松本 \leftrightarrow 柏): 50千円(SK) / 150千円(Tibet)

Relative intensity map
in two hemispheres

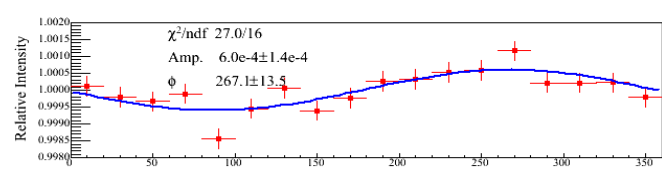
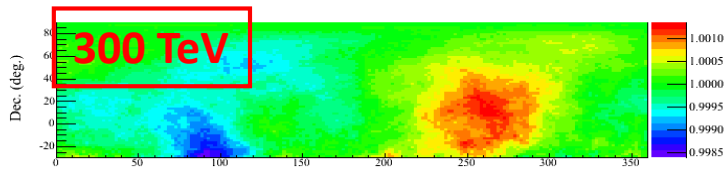
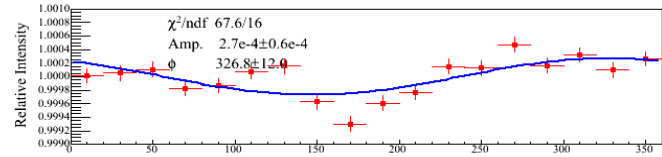
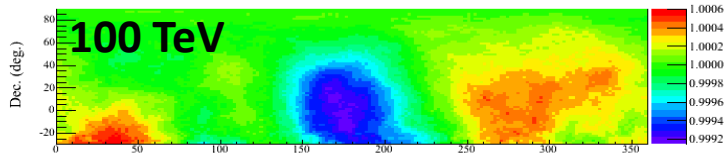
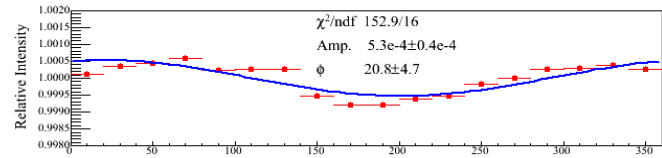
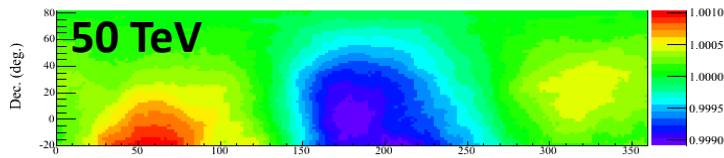
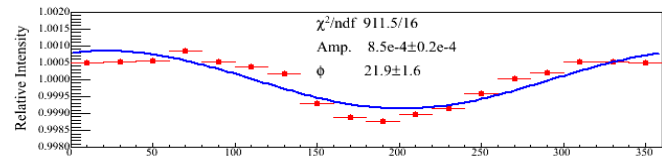
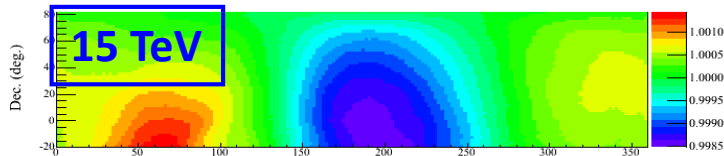


Tibet AS γ (7 TeV)
(Amenomori et al., Science, 314, 2006)

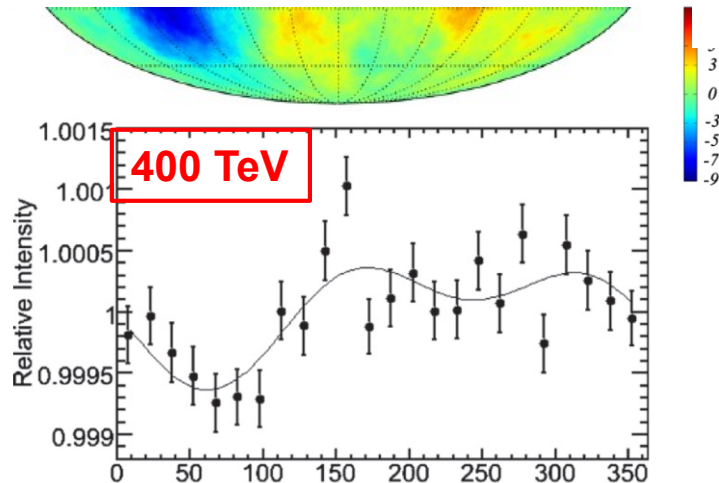
Ice Cube (20 TeV)
(Abbasi et al., arXiv:1005.2960v1, 2010)

E-dependence (1st harmonics in 1D plot)

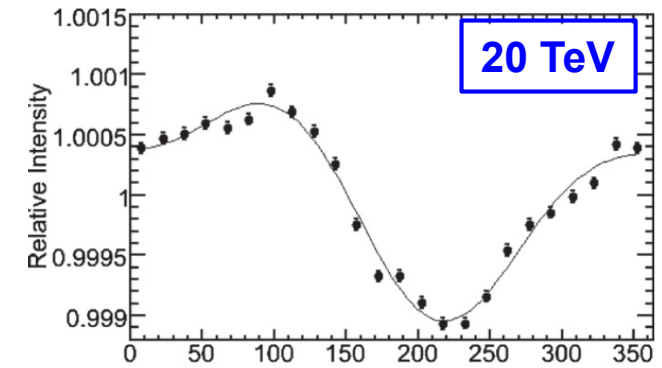
Tibet AS γ
(Amenomori+ 2015)



IceCube
(Abbasi+ 2012)

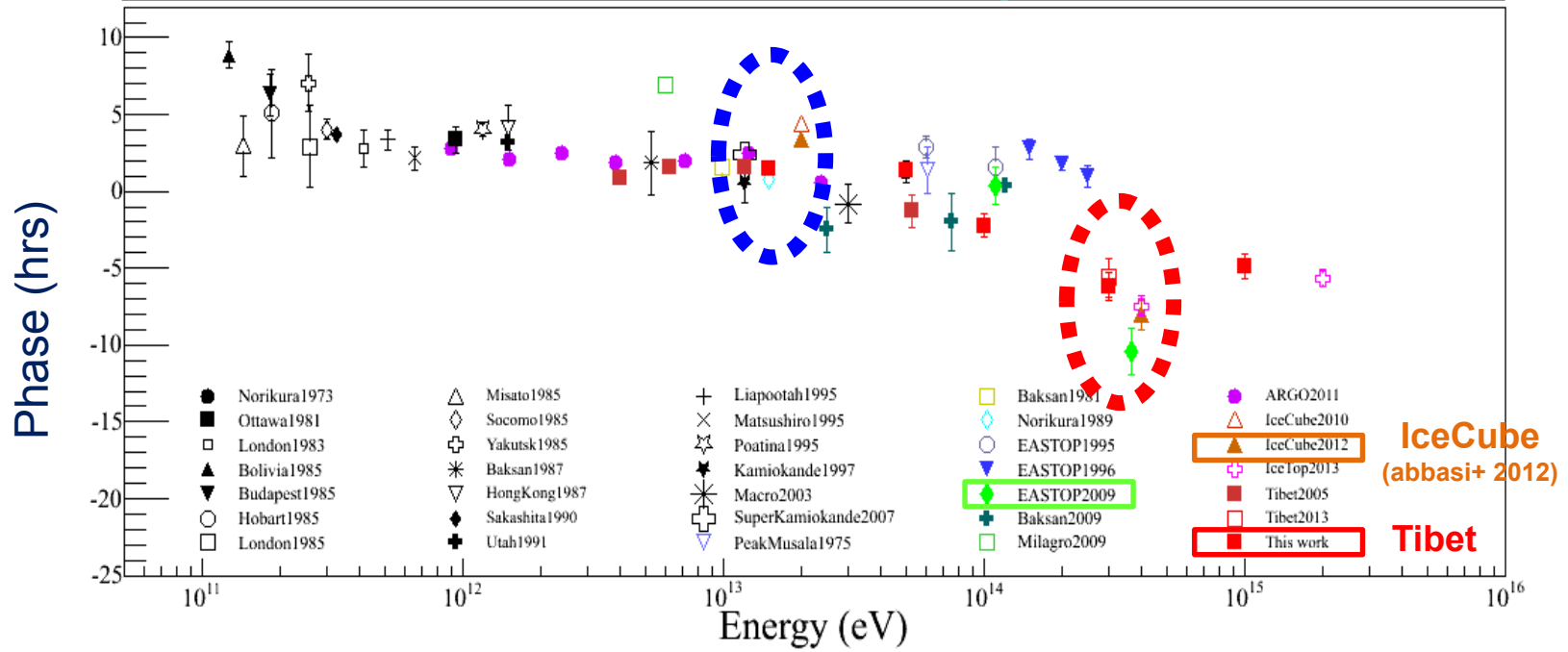
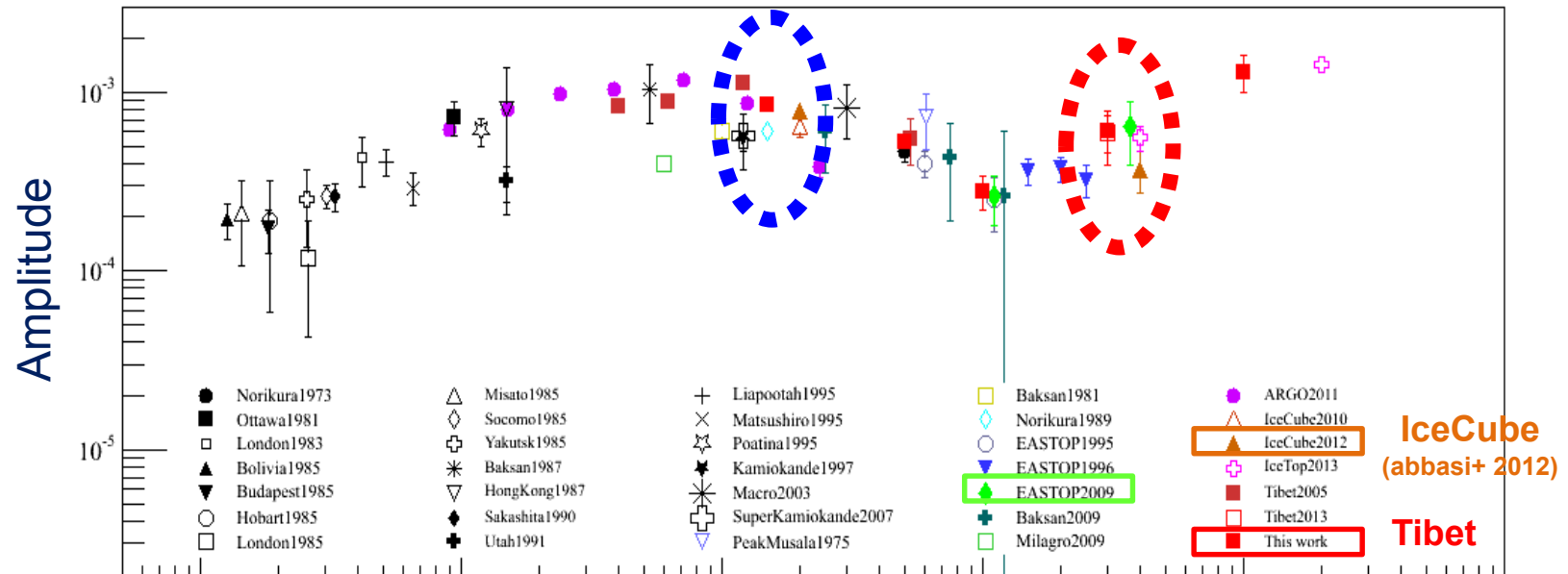


1D profile in two hemispheres

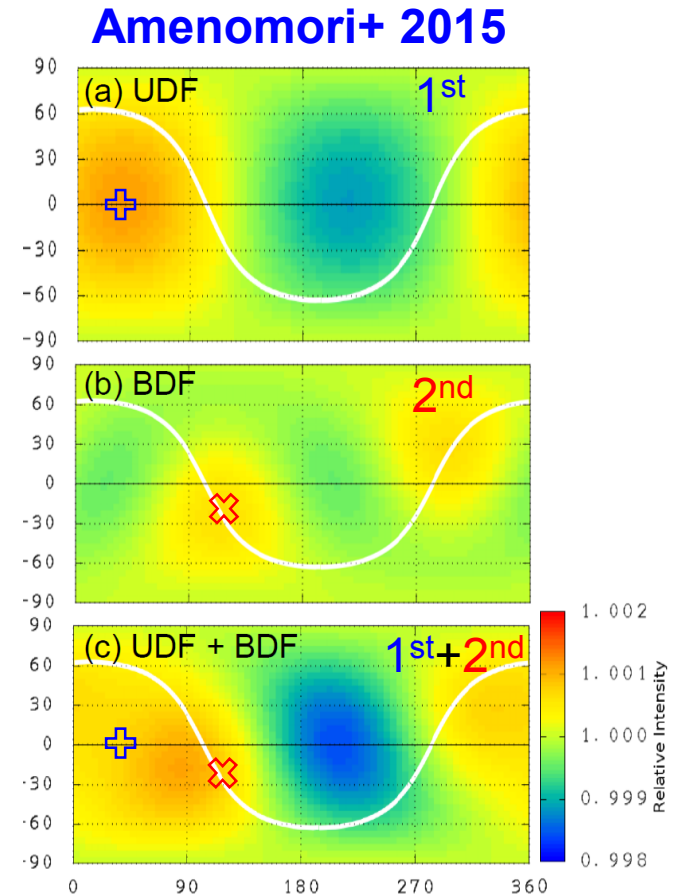
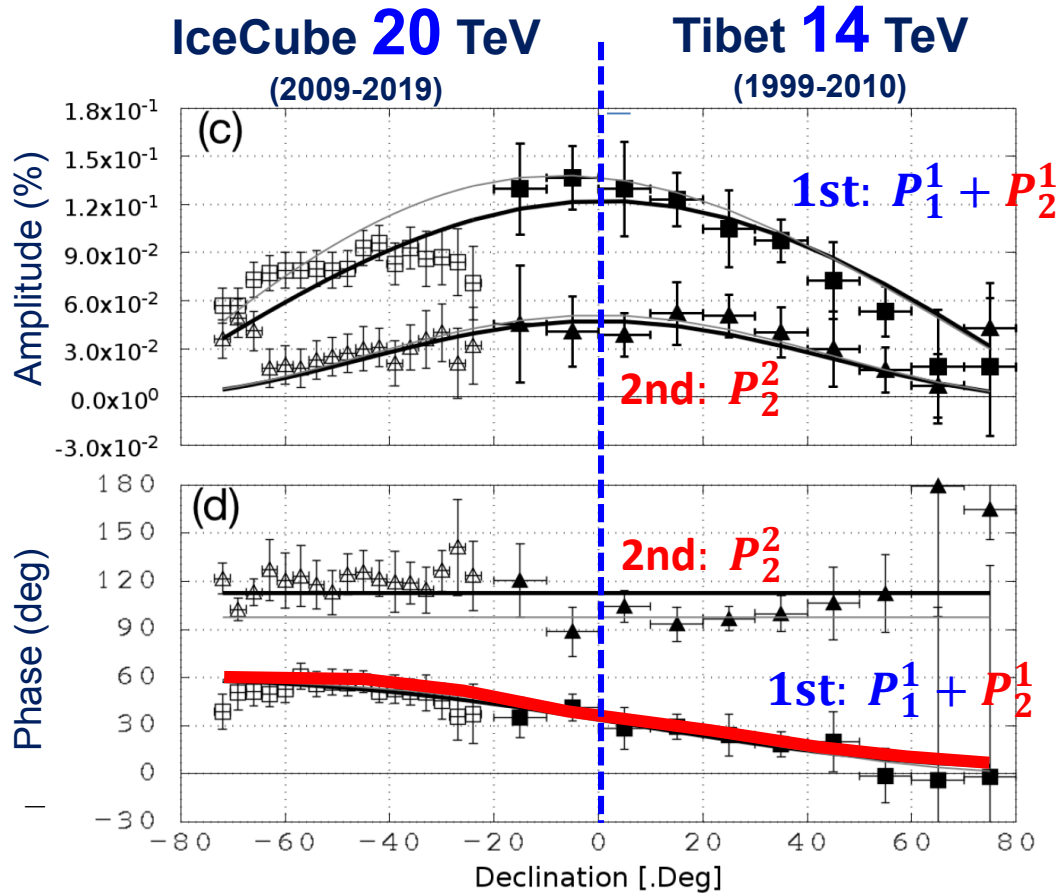


E-dependence (1st harmonics in 1D plot)

Amenomori+ 2015

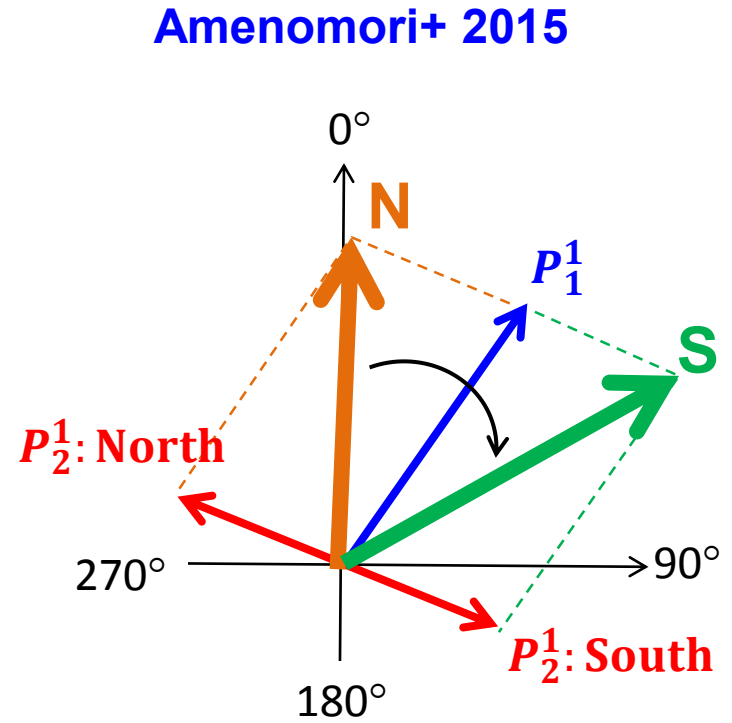
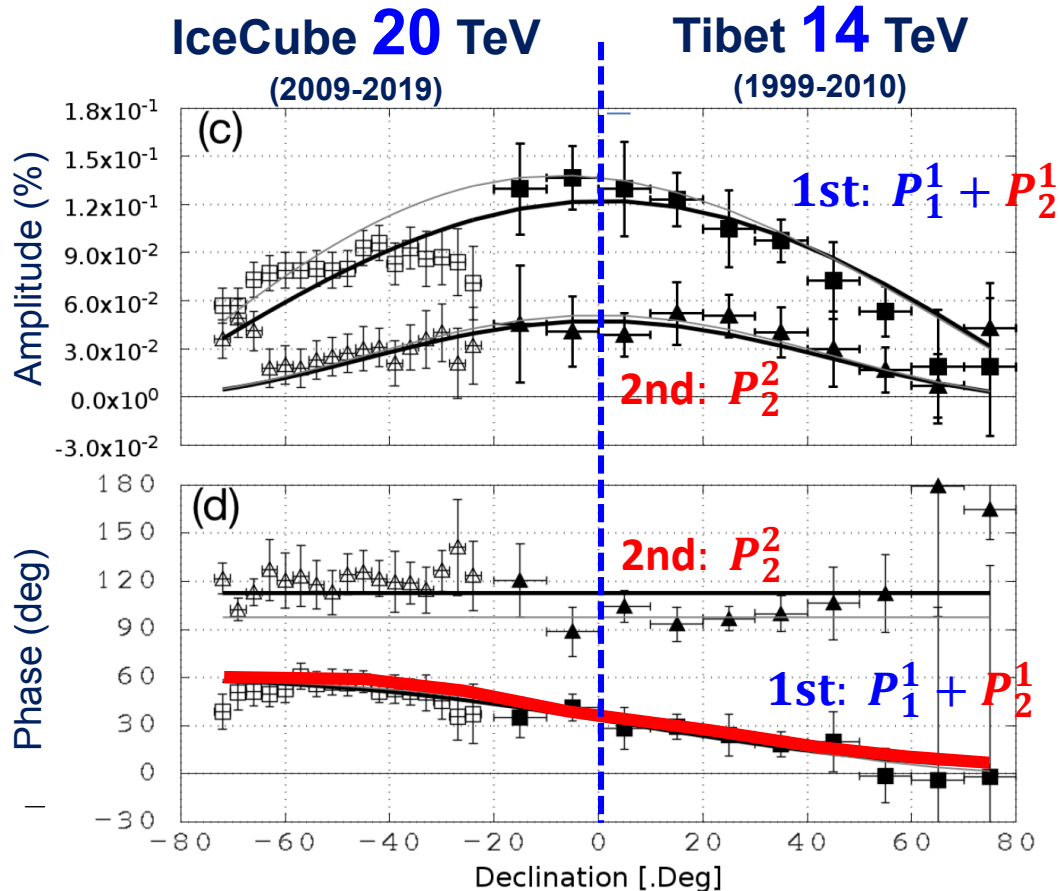


Combination analysis of the 1st & 2nd order anisotropies @~10 TeV



data select	A_1 [%]	α_1 [.deg]	A_2 [%]	α_2 [.deg]	δ_2 [.deg]	$\chi^2/n.o.f$
Tibet only	0.13	39.96	0.07	97.5	-22.5	10.5/(40-5)
Tibet & IceCube	0.11	33.95	0.07	112.5	-17.5	82.0/(108-5)

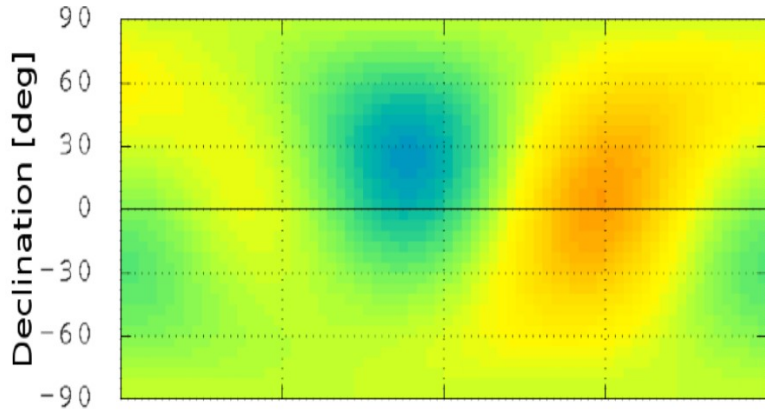
Combination analysis of the 1st & 2nd order anisotropies @~10 TeV



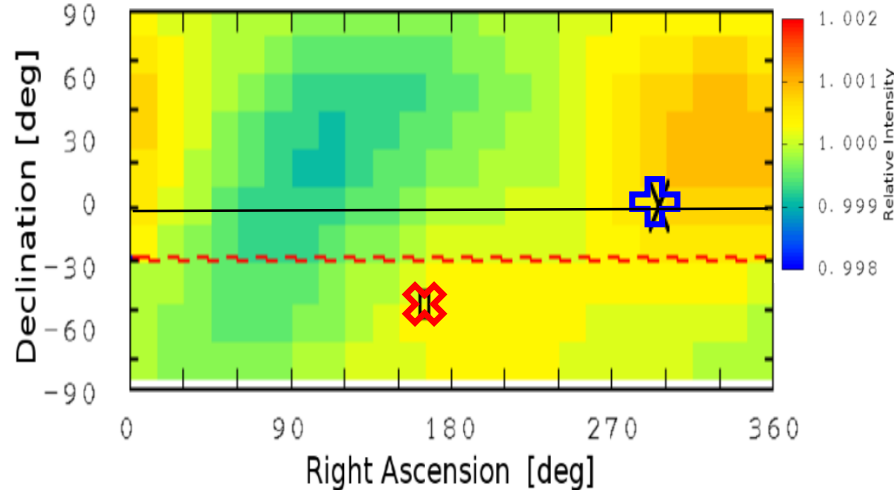
data select	A_1 [%]	α_1 [.deg]	A_2 [%]	α_2 [.deg]	δ_2 [.deg]	$\chi^2/n.o.f$
Tibet only	0.13	39.96	0.07	97.5	-22.5	10.5/(40-5)
Tibet & IceCube	0.11	33.95	0.07	112.5	-17.5	82.0/(108-5)

Combination analysis @~100 TeV *in progress*

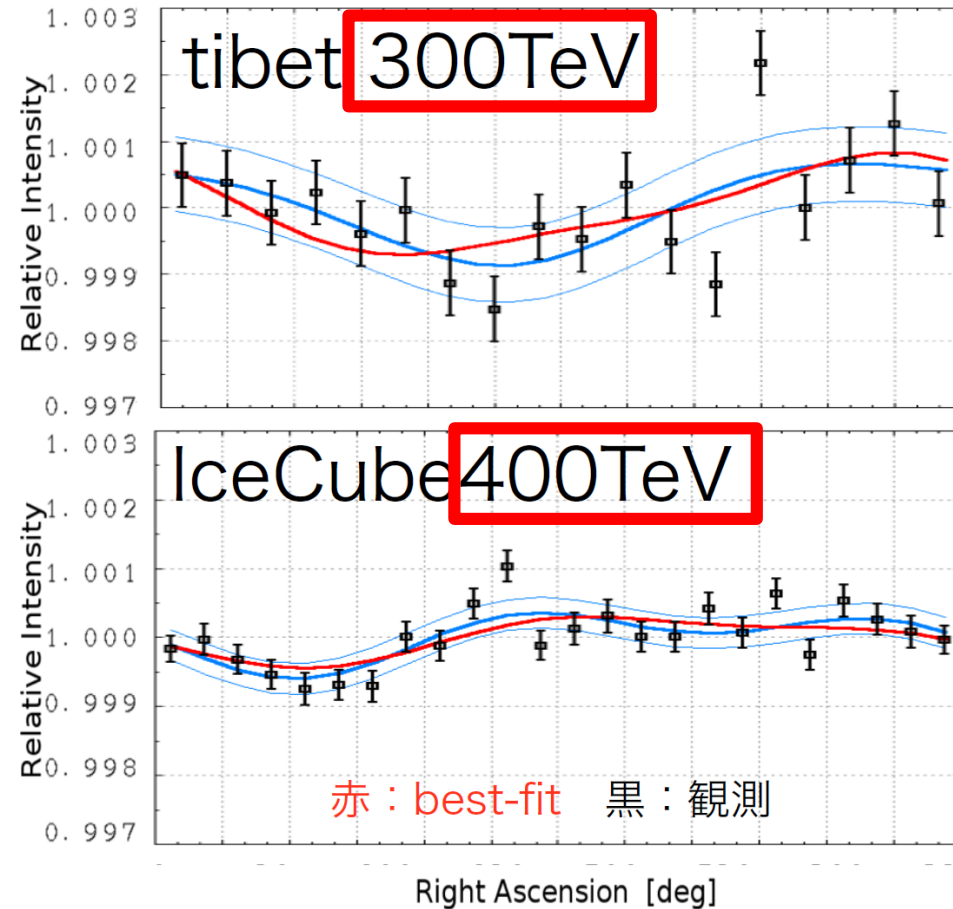
Best-fit by combination analysis



Best-fit by 2D map analysis



中村佳昭 修士論文(信州大)



Still inconclusive due to large statistical & systematic errors

まとめ

- ~10 TeV領域では、1D plotの1次ハーモニクスの位相が南半球で後退している様子が、1次と2次の異方性のcombinationにより再現できた。
- 上記combination analysisを~100 TeV領域で行うためには、統計誤差と系統誤差の見直しが必要。
- 2次元強度マップに対するbest-fitを行ったが、結果がcombination analysisと一致していない。
- 今後以上の問題点を克服し、異方性のエネルギー依存性を明らかにして行きたい。

本共同研究へのご支援に感謝します。