NLFFF calculations of the solar coronal magnetic field based on Hinode observations

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● **Abstract**

Our study focuses on understanding of the mechanism responsible for the occurrence of the solar flares. We derive 3D magnetic field structure in the corona by performing a 3D magnetohydrodynamics simulation using vector magnetic field maps mainly acquired with the Hinode spacecraft. We investigate 3D magnetic field structure formed in the solar atmosphere responsible for the occurrence of solar flares.

Ref. URL: http://www.isas.jaxa.jp/home/solar/solarPlasma/whatsSolarPlasma.html

● **Reasons and benefits of using JAXA Supercomputer System**

We perform 3D magnetohydrodynamics numerical simulations by using vector magnetic field data acquired with the Hinode spacecraft in order to derive 3D magnetic field structures in the solar corona. We need large computational resource in order to perform three-dimensional magnetohydrodynamics simulations.

● **Achievements of the Year**

We did not use the supercomputer extensively because we spent most of the time on the examination of the data already processed with the computer last year.

● **Publications**

- Peer-reviewed papers

Hasegawa, T., Shimizu, T., Temporal Behaviors of Magnetic Helicity Injections by Self and Mutual Sunspot Rotations, The Astrophysical Journal, under review

🔵 **Usage of JSS**

● **Computational Information**

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	1 - 144
Elapsed Time per Case	3 Minute(s)

● **JSS3 Resources Used**

Fraction of Usage in Total Resources[1](%): 0.00

Details

Computational Resources		
System Name	CPU Resources Used (core x hours)	Fraction of Usage[2](%)
TOKI-SORA	61,179.64	0.00
TOKI-ST	0.00	0.00
TOKI-GP	0.00	0.00
TOKI-XM	0.00	0.00
TOKI-LM	0.00	0.00
TOKI-TST	3,272.20	0.07
TOKI-TGP	0.00	0.00
TOKI-TLM	0.00	0.00

File System Resources		
File System Name	Storage Assigned (GiB)	Fraction of Usage[2](%)
/home	20.29	0.02
/data and /data2	200.84	0.00
/ssd	200.00	0.05

Archiver Resources		
Archiver Name	Storage Used (TiB)	Fraction of Usage*2(%)
J-SPACE	0.00	0.00

*1: Fraction of Usage in Total Resources: Weighted average of three resource types (Computing, File System, and Archiver).

*2: Fraction of Usage：Percentage of usage relative to each resource used in one year.

- **ISV Software Licenses Used**

ISV Software Licenses Resources		
	ISV Software Licenses Used (Hours)	Fraction of Usage*2(%)
ISV Software Licenses (Total)	0.00	0.00

*2: Fraction of Usage：Percentage of usage relative to each resource used in one year.