

Prediction of the aircraft lightning strike

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● Abstract

In this study, we conducted the numerical simulation by bulk lightning model using the supercomputer operated by JAXA in order to the prediction of the risk area of the aircraft lightning strike a few days before. We also examined the availability of the supercomputer of JAXA for the simulation by the bulk lightning model.

● Reasons and benefits of using JAXA Supercomputer System

We used the JAXA's supercomputer for the simulation by the bulk lightning model, which required the higher computational cost compared to the usual meteorological model.

● Achievements of the Year

The numerical simulations by the bulk lightning model coupled with a meteorological model, Scalable Computing for Advanced Library and Environment (SCALE) were conducted by the supercomputer operated by JAXA (SSO3), and we confirmed that the simulated results were reasonable compared with those obtained by supercomputers operated by the other institutes. In addition, the algorithm to calculate the area with the aircraft lightning strike, which was developed by JAXA, was applied for the results of the simulation by the bulk lightning model. However, we also found that the SSO3 is very fast for the simulation of the bulk lightning model, but waiting time for the job is too long for the simulations for many cases.

● Publications

N/A

● Usage of JSS

● Computational Information

Process Parallelization Methods	MPI
Thread Parallelization Methods	N/A
Number of Processes	1 - 400
Elapsed Time per Case	4 Hour(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	3.19	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	0.00	0.00
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	0.00	0.00
/data and /data2	0.00	0.00
/ssd	0.00	0.00

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.