

Development of volcanic ash algorithm using multiple satellite data

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JAXA PI-Workshop 2022 (2022.1.18) PI No. ER2GCN206

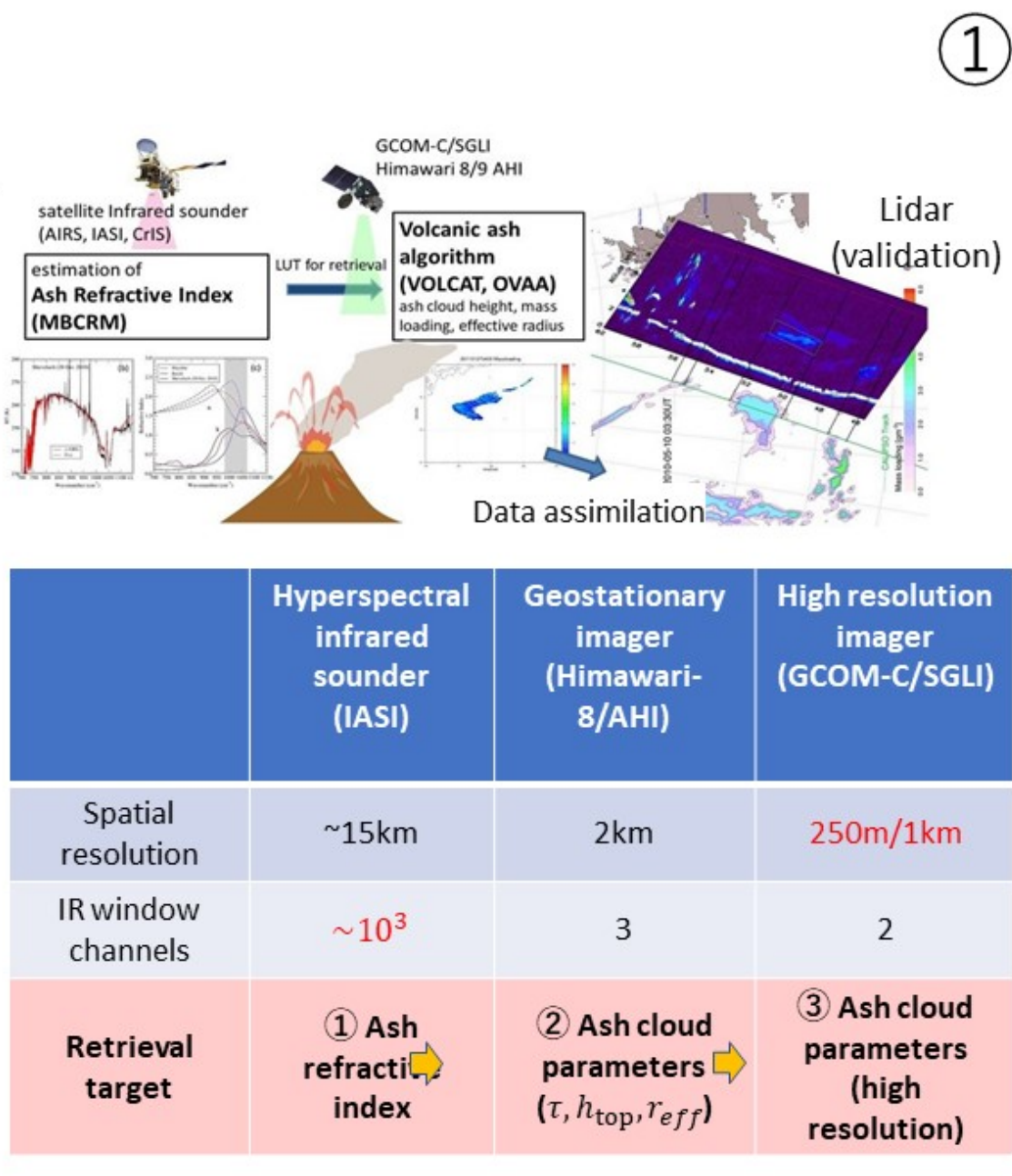
Abstract

We have developed an algorithm to estimate the characteristics of the volcanic ash plume.

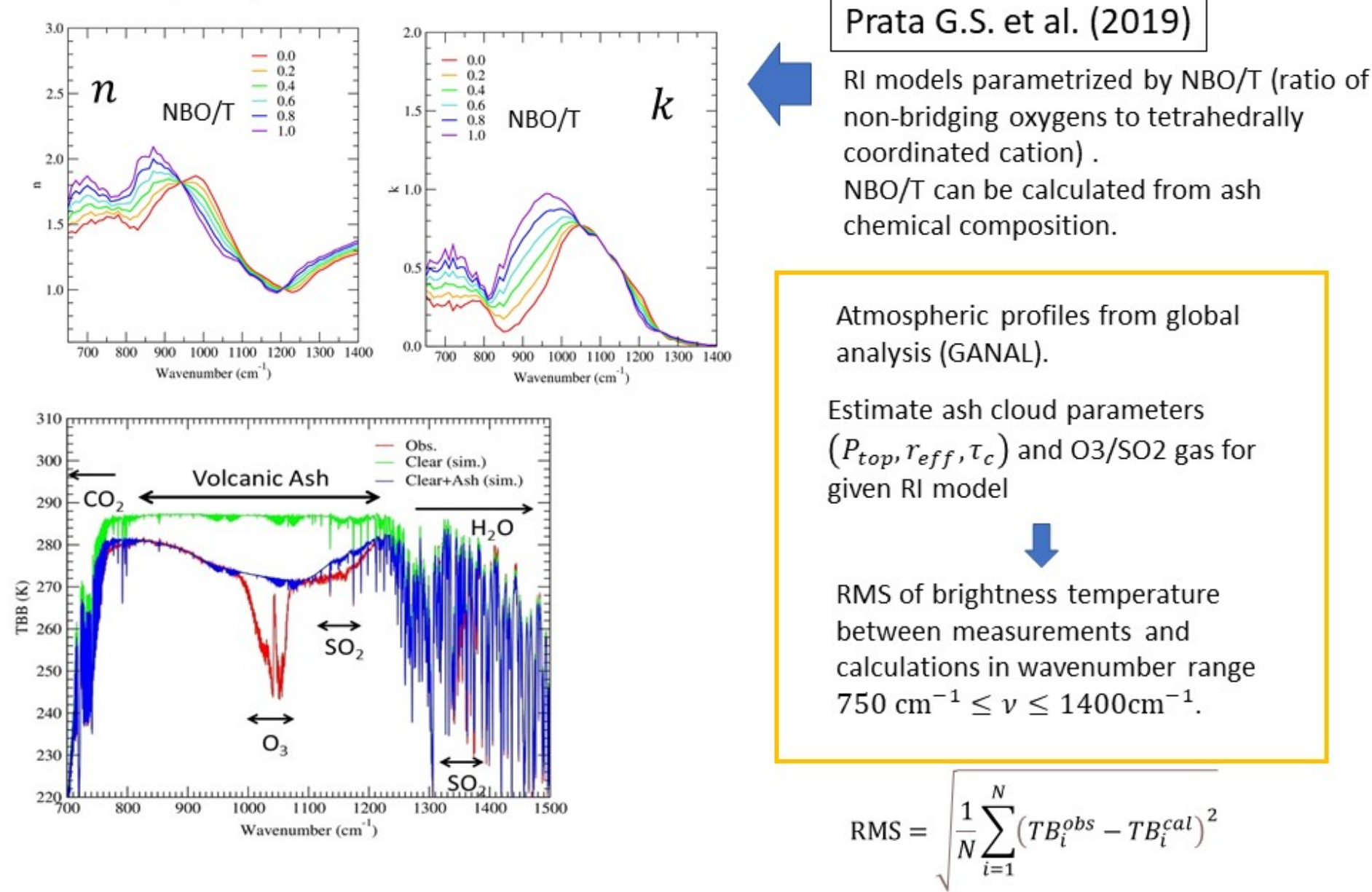
A **refractive index (RI) model** of the ash particles was estimated from brightness temperature spectrum (**BTS**) measured by satellite **infrared sounder** and radiative transfer calculations.

The same RI model was applied to the analysis algorithms (**OVAA**) of the multi-channel satellite imagers, **HIMAWARI-8/AHI** and **GCOM-C/SGLI**.

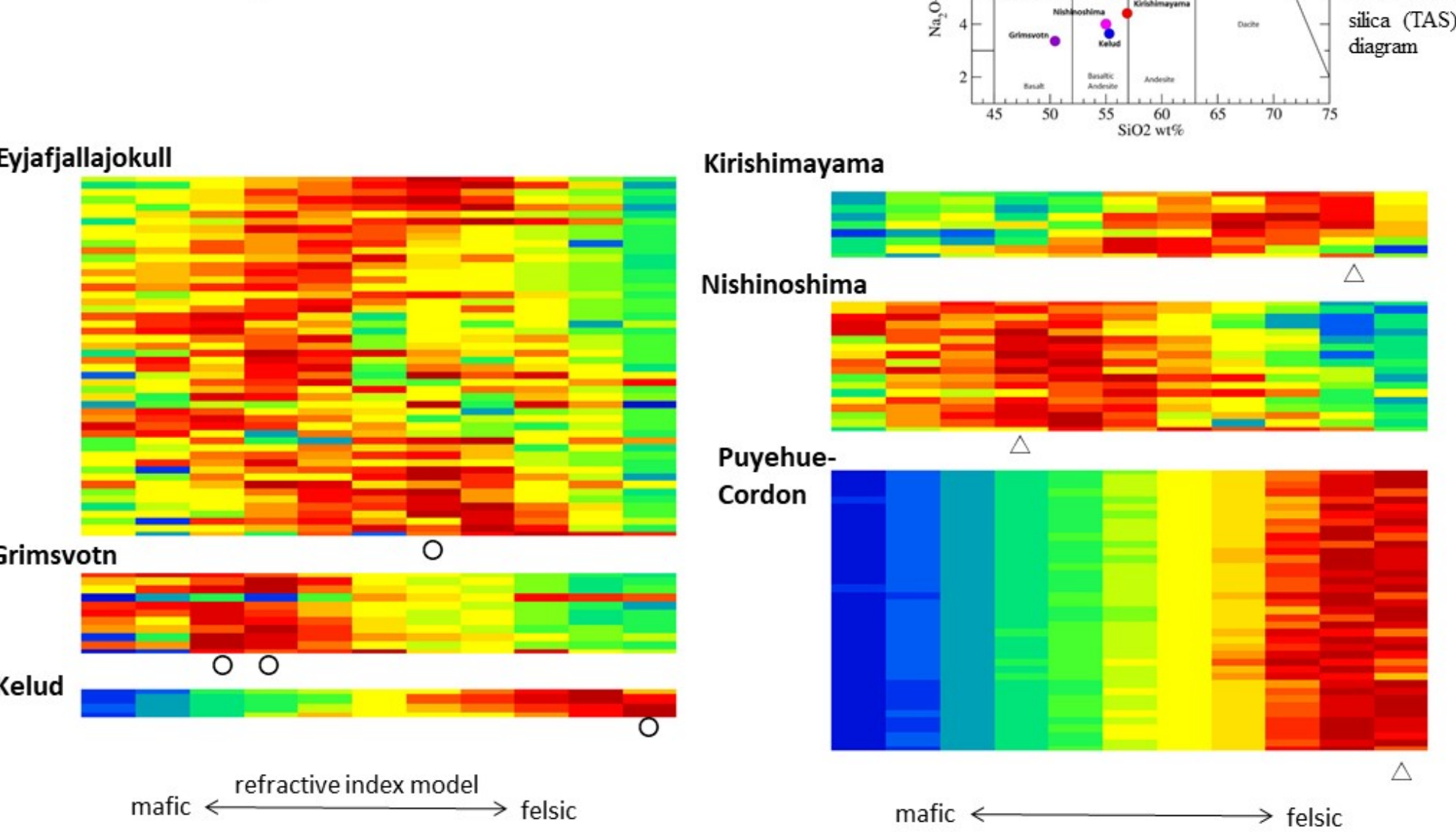
The results of OVAA were used to the initial values of the atmospheric transport model (**ATM**).



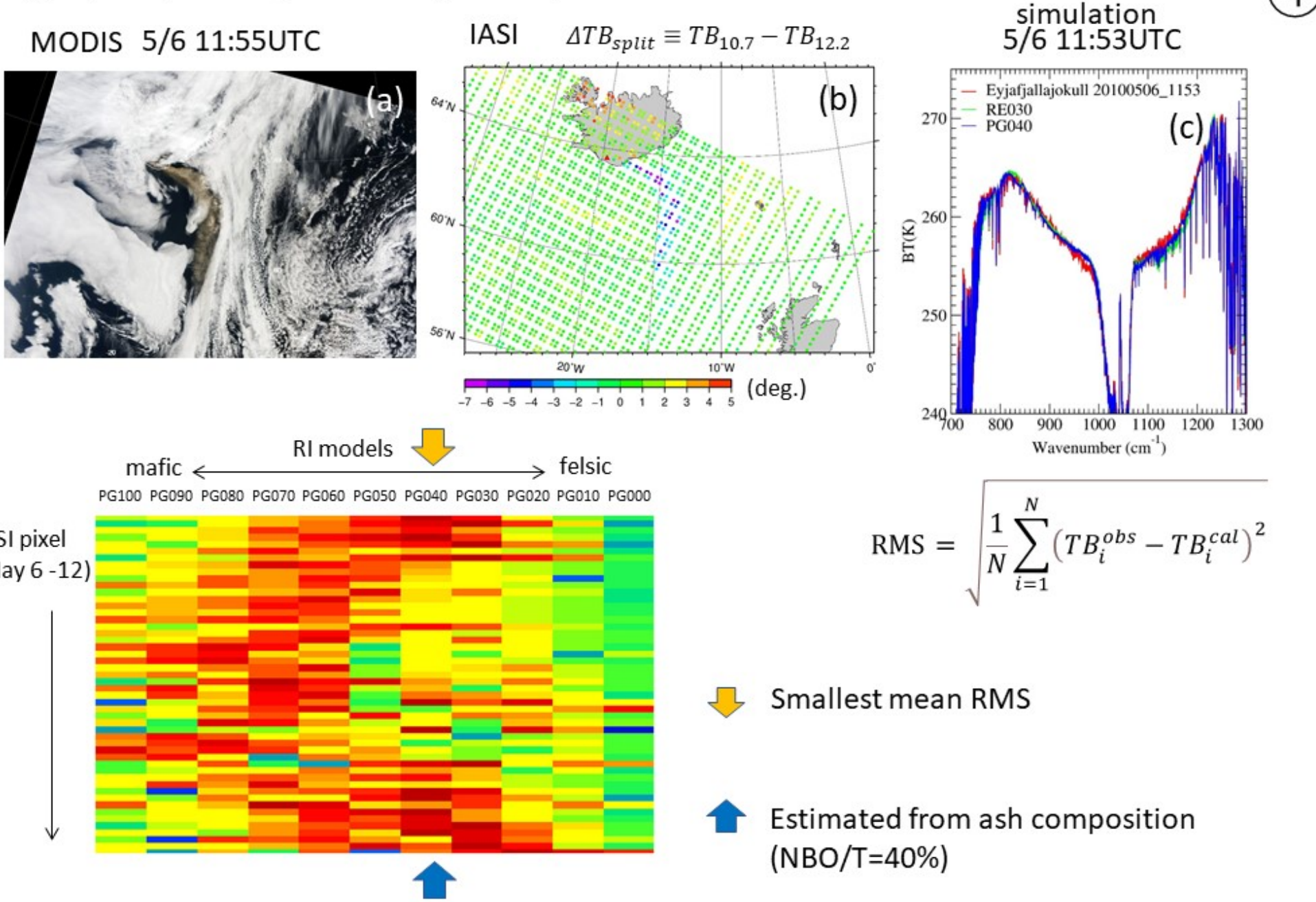
Estimation of ash particle refractive index (RI) model from infrared sounder (IASI) data



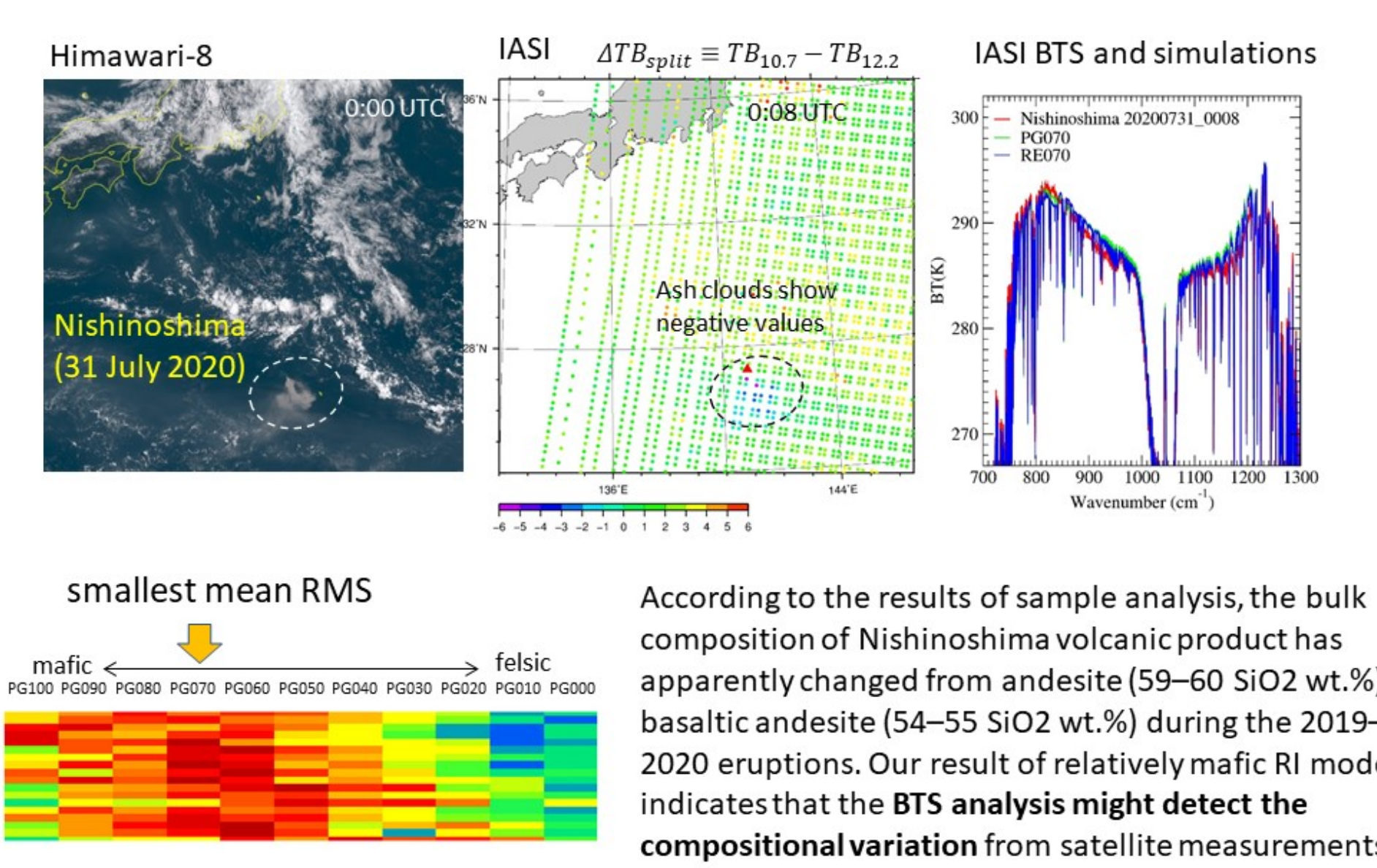
Ranking of small RMS shows some consistency with ash composition of the volcano



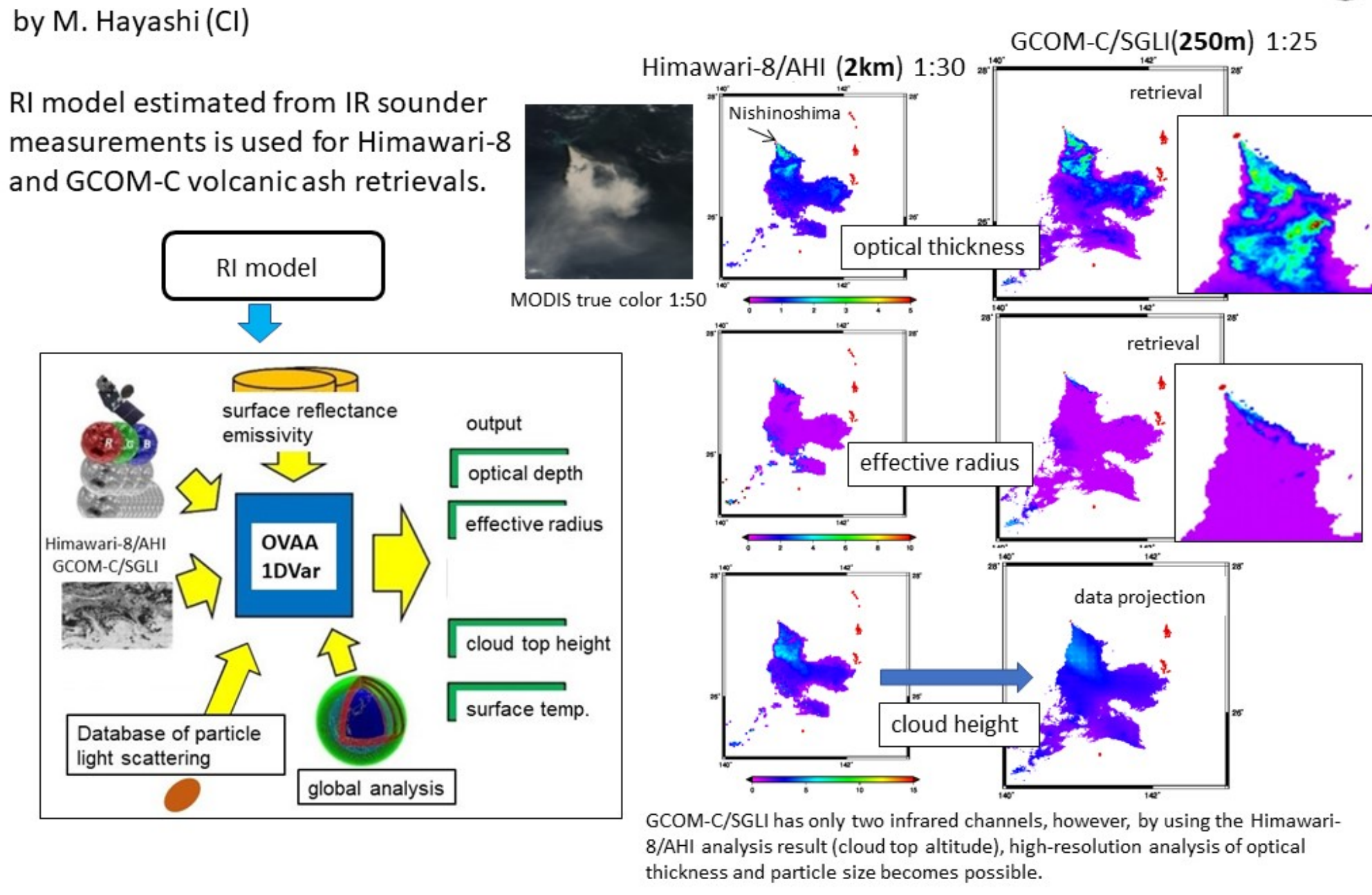
Eyjafjallajokull (6-12 May 2010)



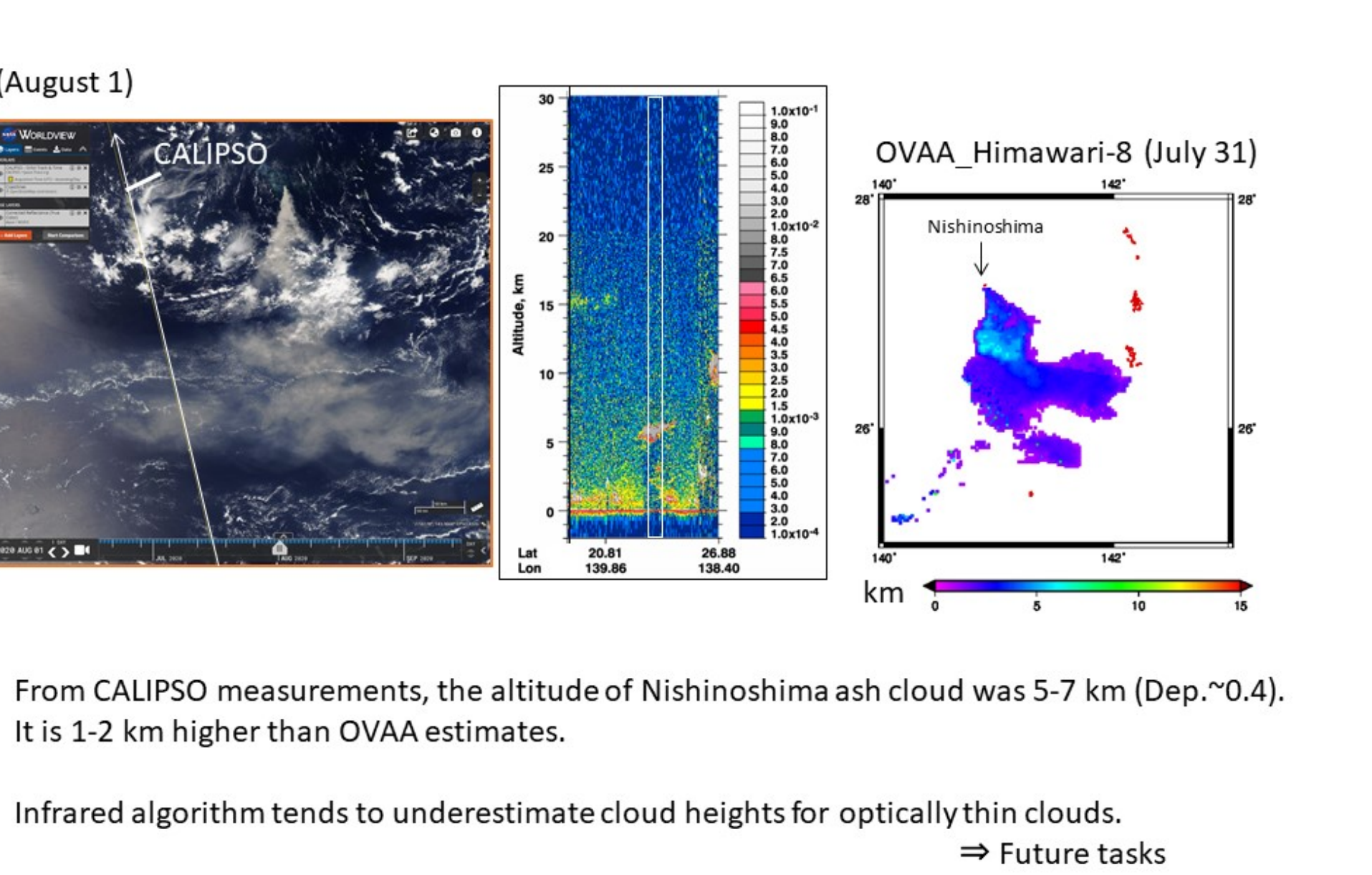
Nishinoshima (31 July 2020)



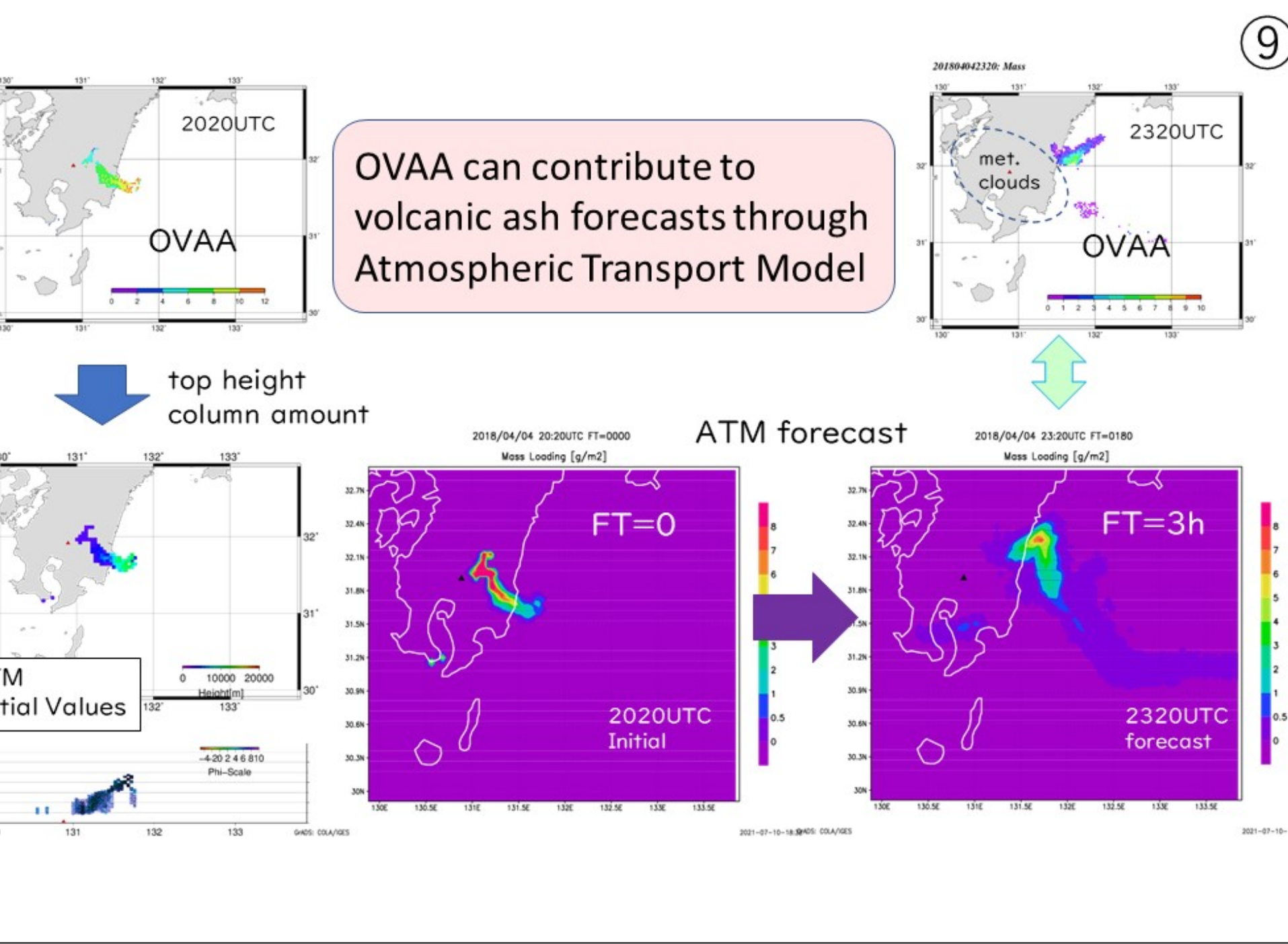
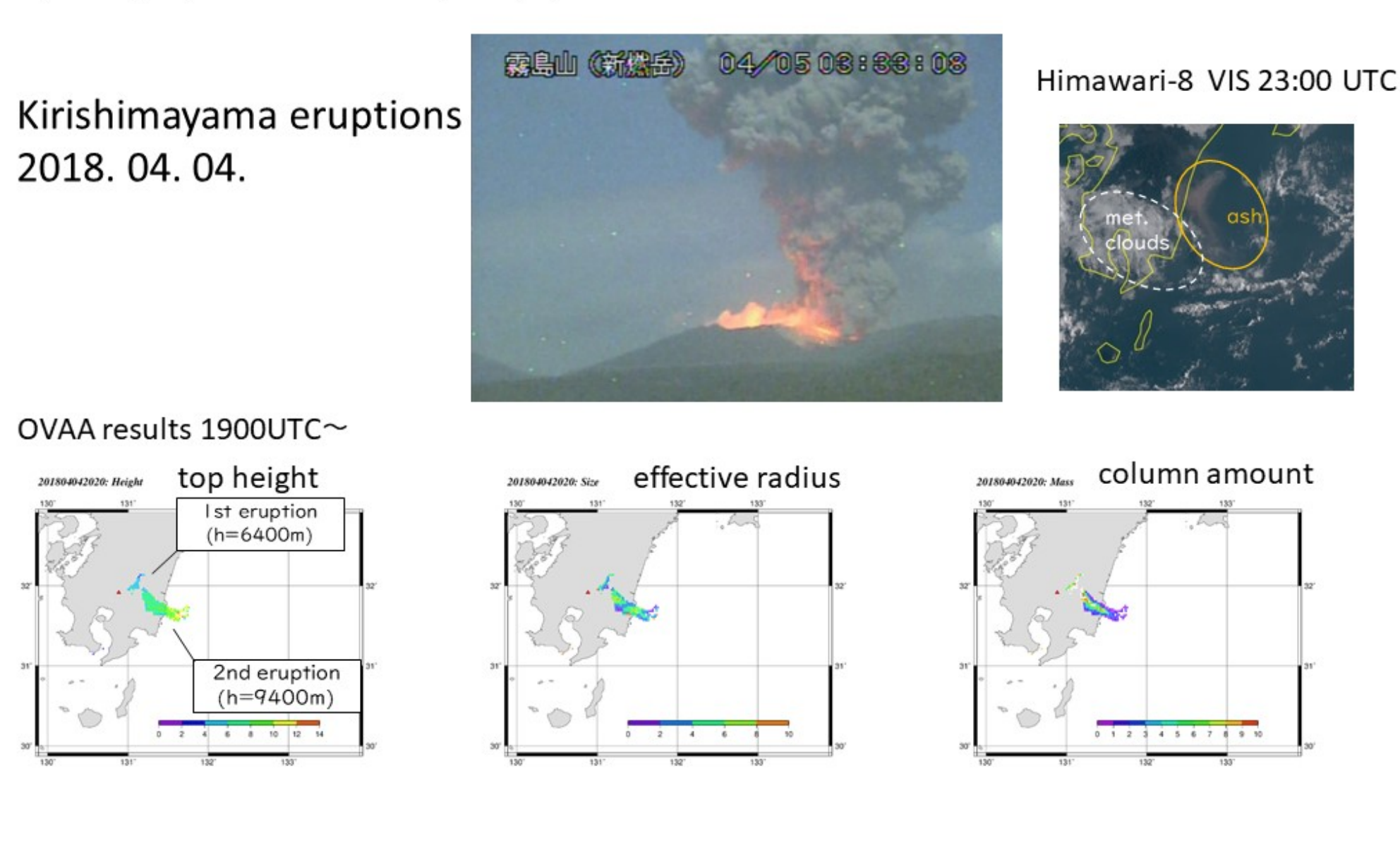
1DVar analysis by Optimal Volcanic Ash Algorithm (OVAA)



Comparison to CALIPSO measurements for ash top heights



Application of OVAA to initial values of Atmospheric Transport Model (ATM)



Summary

- A prototype of the multiple satellites volcanic ash algorithm has been developed.
 - A paper on infrared sounder analysis was accepted by AMT.
 - A paper on OVAA for Himawari-8/AHI and GCOM-C/SGLI is in preparation.
- We tried to apply the OVAA results to the initial values of the atmospheric transport model.
- More case studies of volcanic eruptions and evaluation of the results of OVAA will be done in future works.