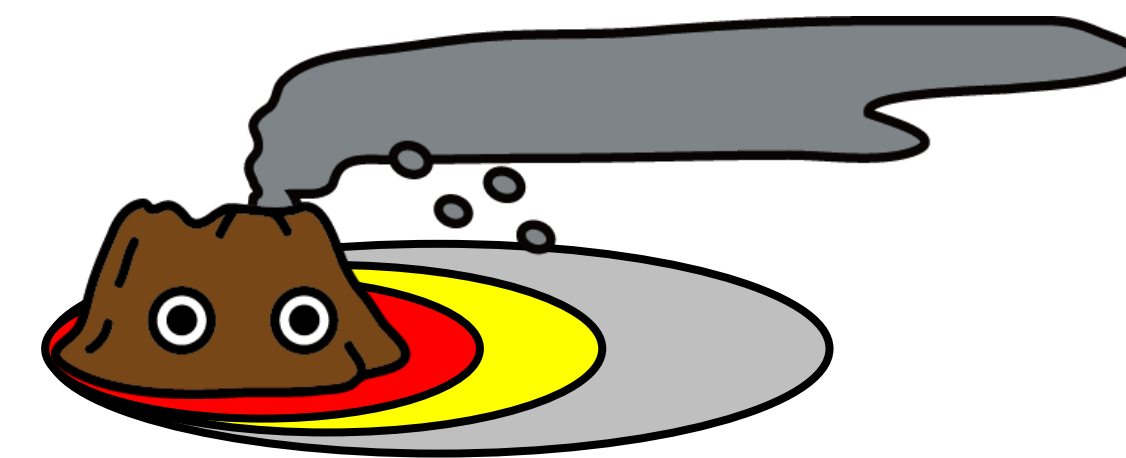


# Operations of volcanic ash information in JMA

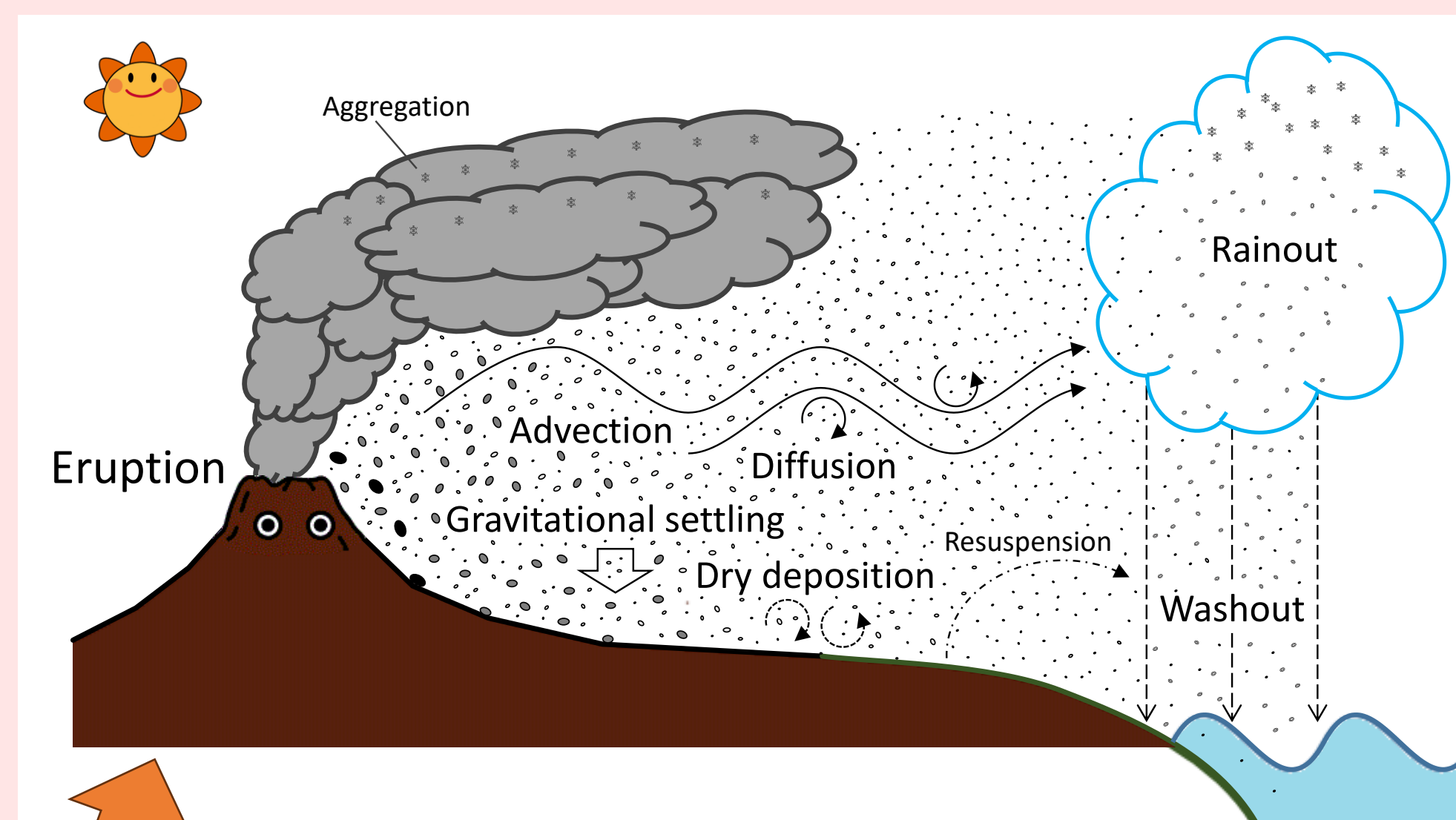
Nishijo Akira<sup>1</sup> 1.Japan Meteorological Agency



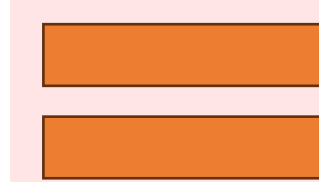
**Abstract:** Japan Meteorological Agency (JMA) issues volcanic ash forecast information based on the simulation using our numerical weather prediction model and advection-diffusion model. Volcanic Ash Fall Forecast (VAFF) is the prediction of area and amount of ash fall on the ground for residents around the volcano. Volcanic Ash Advisory (VAA) is the prediction of spreading ash in the air for aviation users.

## Monitoring and modelling of volcanic ash

The JMA headquarters is responsible for issuing volcanic ash information. Based on observation reports and/or satellite observation data, the spreads of volcanic ash in the atmosphere is simulated by running a dispersion model with the latest three-dimensional forecast atmospheric data from JMA's global numerical weather prediction system.<sup>1</sup> The Volcanic Ash Fall Forecast (VAFF) shows how much ash is predicted to fall to the ground surface, while the Volcanic Ash Advisory (VAA) shows the area of ash floating in the air.



Concept of dispersion model<sup>2</sup>



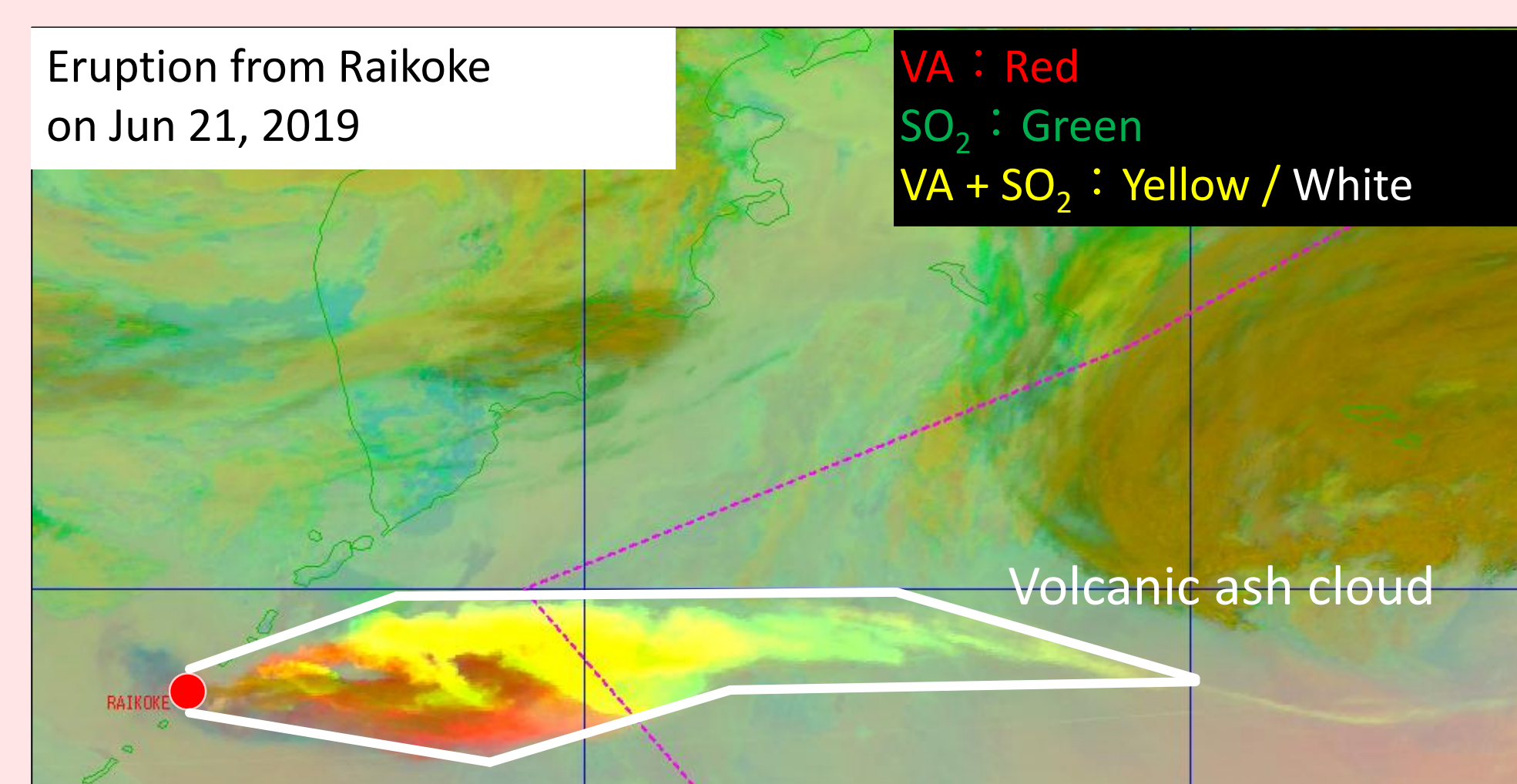
Supercomputer system in JMA



VONA, Pilot report, etc...



JMA operation room



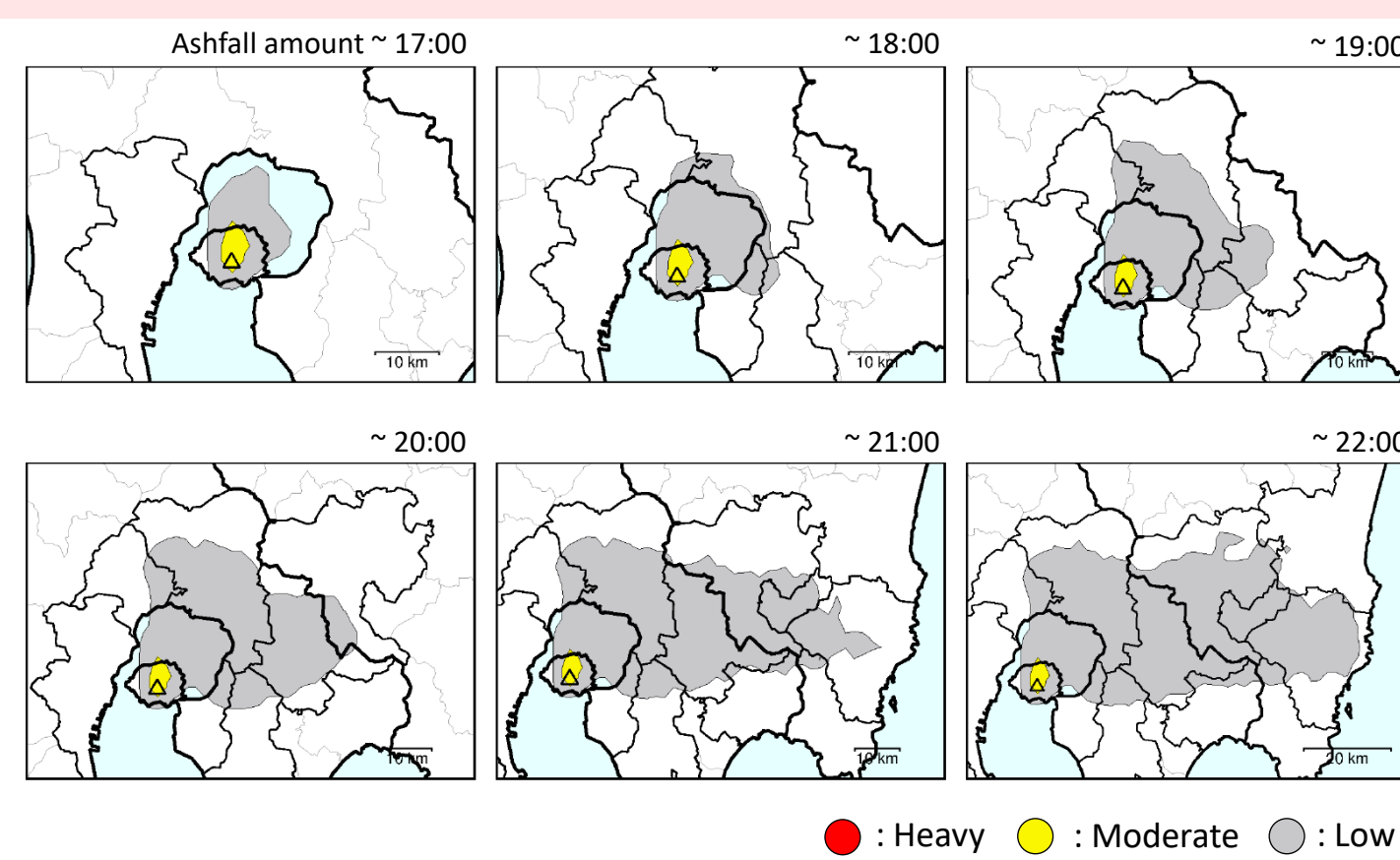
Satellite observation of volcanic ash cloud

## Volcanic Ash Fall Forecasts (VAFF)

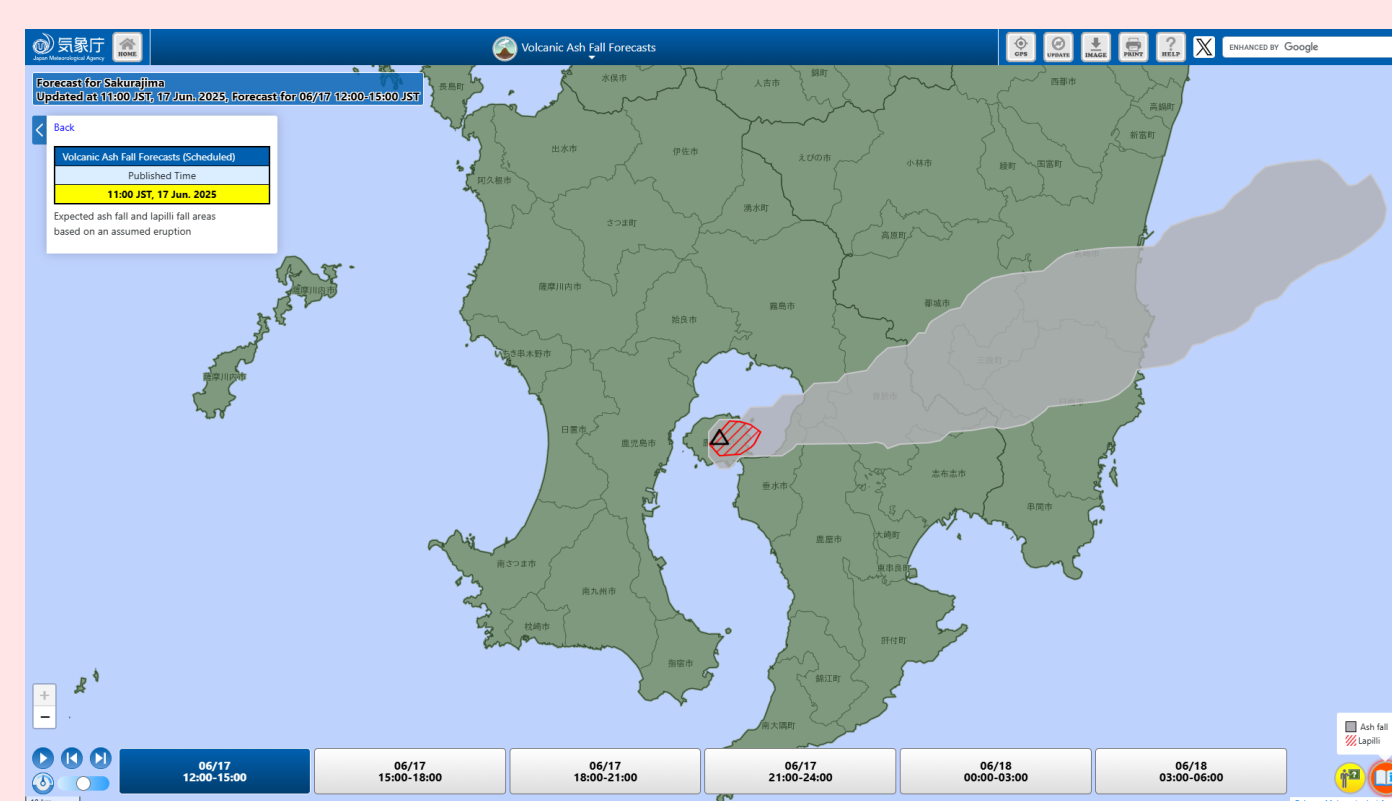
Preliminary Forecasts and Detailed Forecasts show the ash fall area expected after an actual eruption. Preliminary Forecasts are issued within 5-10 minutes of the start of an eruption using the result which best fit the observed conditions.

Detailed Forecasts are issued within 20-30 minutes of the start of an eruption, based on plume height as estimated via visual observation, and are more accurate than Preliminary Forecast.<sup>3</sup>

Scheduled Forecasts are issued periodically (e.g., every three hours) when there is a risk of eruption. This information includes potential areas of ash fall and lapilli fall to support preparedness in local communities.

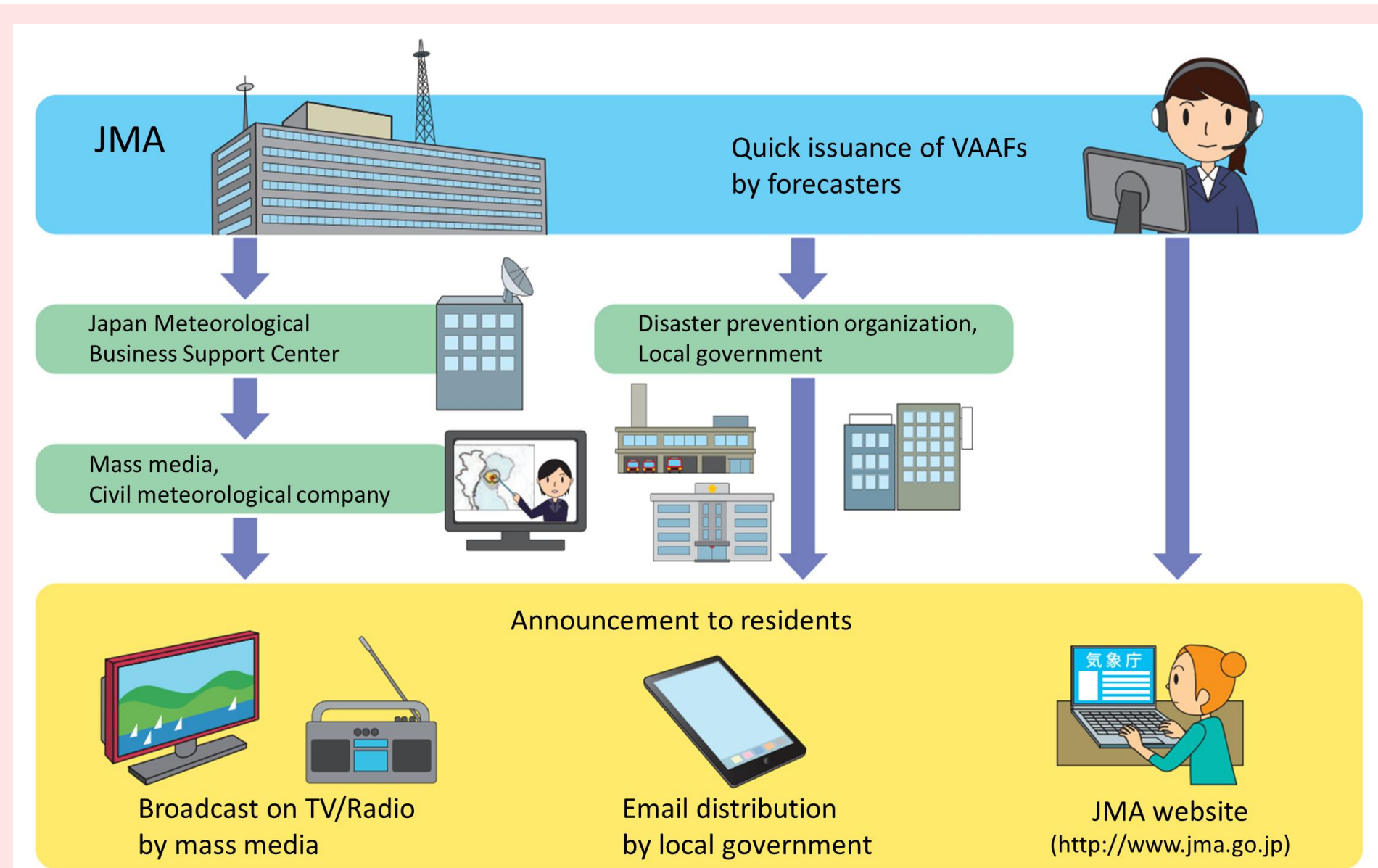


Detailed Volcanic Ash Fall Forecasts



Scheduled Volcanic Ash Fall Forecasts (JMA website)

VAAF is provided on the JMA website and broadcasted through TV and radio. It also disseminated to national disaster management agencies and local governments. It helps local residents to mitigate damage from volcanic ash.



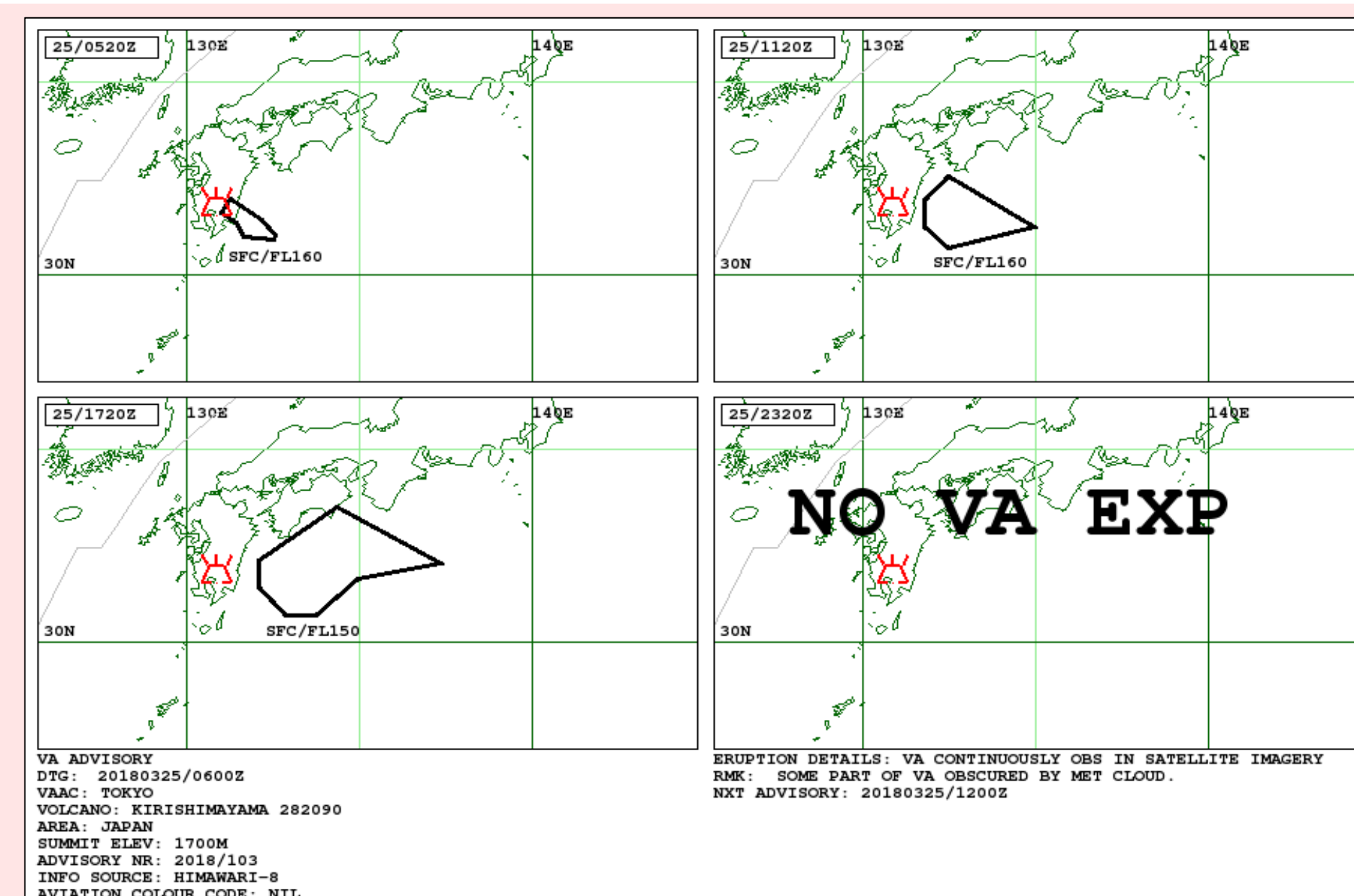
Distribution of VAAF

## Reference

1. JMA 2025, OUTLINE OF THE OPERATIONAL NUMERICAL WEATHER PREDICTION AT THE JAPAN METEOROLOGICAL AGENCY
2. Shimbori 2016, Tephra Transport: Modeling and Forecasting, KAZAN No.61
3. Hasegawa et al. 2015, Improvements of volcanic ash fall forecasts issued by the Japan Meteorological Agency, Journal of Applied Volcanology
4. Shirato 2013, Volcanic Ash Advisories, Technical Note of the National Research Institute for Earth Science and Disaster Prevention No. 380
5. Furukawa et al. 2024, JpGU

## Volcanic Ash Advisory (VAA)

VAA describes the latest extents of volcanic ash clouds and forecasting their trajectories.<sup>4</sup> VAAs are updated as a minimum at six-hour intervals for as long as ash clouds are identified in satellite imagery.

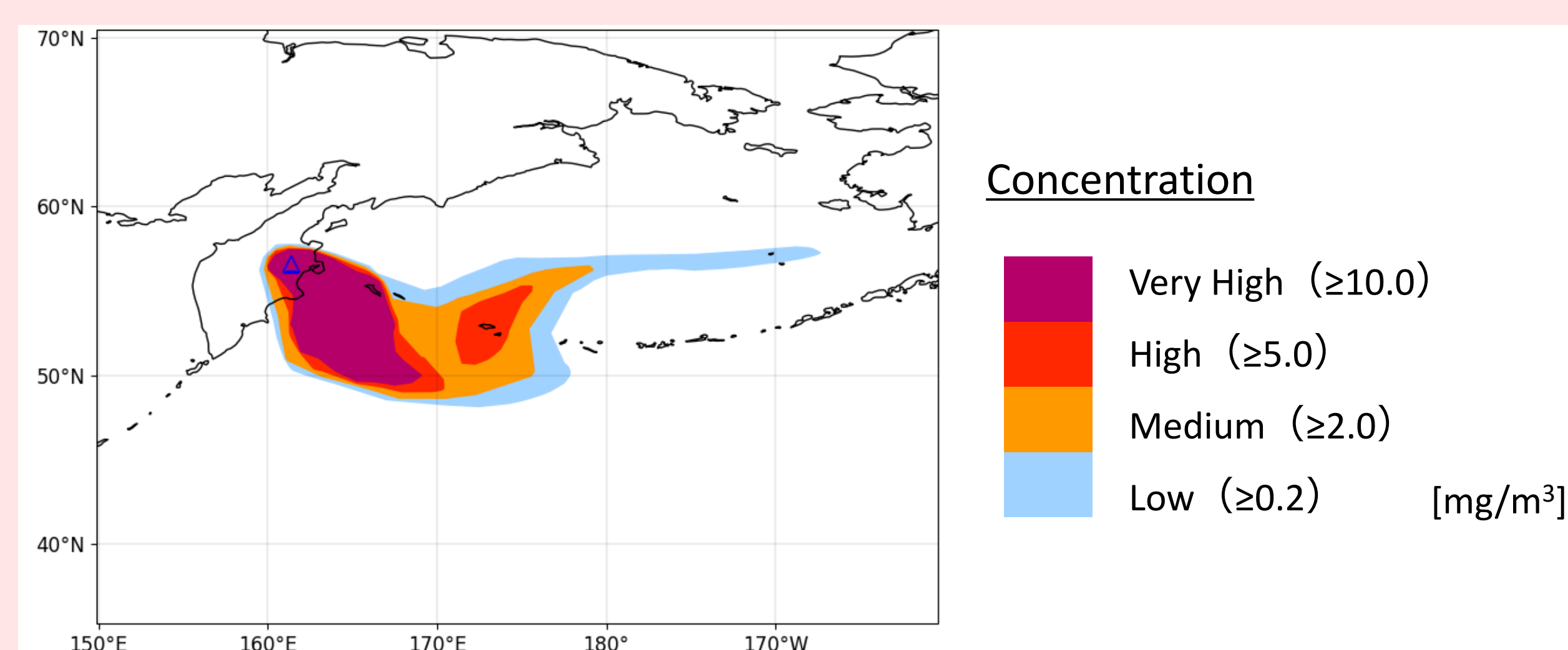


VAA graphic

JMA is designated as the Tokyo Volcanic Ash Advisory Center (VAAC) and responsible for the East Asia and Northwest Pacific regions. VAA is disseminated via aeronautical network and JMA website for airlines, aviation authorities, Meteorological Watch Offices and other VAACs. It is mainly used for aviation control to avoid disasters caused by volcanic ash.

## Quantitative Volcanic Ash concentration information (QVA)

QVA will be introduced as an advanced information of volcanic ash concentration and probabilistic forecasts. It will be provided in a gridded format to encourage its advanced use. JMA is developing a dispersion model, verification methods, and a new data distribution system for the upcoming QVA.<sup>5</sup>



Example of QVA concentration chart