

Volcanic ash supplemental products

The Volcanic Ash Advisory Centre Darwin (VAAC Darwin) produces supplemental volcanic ash products to provide situational awareness and an understanding of the level of forecaster confidence.

Graphical Daily Volcanic Activity Summary (GDAS)

The GDAS is a web interface linked to a database of volcanic activity information within the VAAC Darwin area of responsibility.

It provides access to information on the previous eruptive behaviour of volcanoes, on a yearly basis, as well as information on recent activity.

Volcanic Ash Strength of Evidence Assessment (VASEA)

When an observation (T+0hr) polygon is included in a volcanic ash advisory (VAA) and graphic (VAG), a supplementary VASEA product is issued. The VASEA product provides users with more detailed information on the levels of confidence on specific ash boundaries (high or low), and the considerations that have led to such an assessment. The VASEA product also has the advantage of providing a higher resolution polygon (not limited by the number of points used), allowing as little airspace to be impacted as is possible.

In all situations, the VASEA polygon will be either the same as, or completely contained within, the VAA T+0hr polygon. Unlike a VAA, the VASEA product only displays a single time-step (T+0hr) with polygon boundaries colour-coded according to confidence level. Blue boundaries represent high confidence and pink boundaries represent low confidence. Background satellite imagery is chosen by the VAAC forecaster to best illustrate the distribution of volcanic ash, and notes relating to the assignment of confidence are incorporated into the product.

Confidence levels

A **high confidence** boundary exists when the transition from ash to no ash is sharply discernible on satellite imagery. For example, in situations where, within the

30 minutes prior to the observation, the separation between clearly discernible ash pixels and pixels where ash is clearly not discernible, is less than or equal to 6 nm. Where possible an ensemble approach to ash assessment is used.

A **low confidence** boundary exists when the transition from volcanic ash to no ash is not sharply discernible on satellite imagery; for example, in situations where, within the 30 minutes prior to the observation, the separation between clearly discernible ash pixels and pixels where ash is clearly not discernible, is greater than 6 nm. Again, an ensemble approach to ash assessment is used, combining information from multiple sources.

Factors that influence the confidence level of the polygon boundaries include:

- ash plume being fully or partially obscured by non-volcanic clouds
- availability of visible satellite imagery to discern low altitude ash clouds (not available at night)
- the sun angle, which impacts the discernibility of diffuse ash clouds
- ash dissipation and/or wind regimes that may result in ash clouds with gradual ash concentration gradients
- the timeliness of observational evidence.

A confidence level is also provided for the eruption or ash cloud height, and is based on:

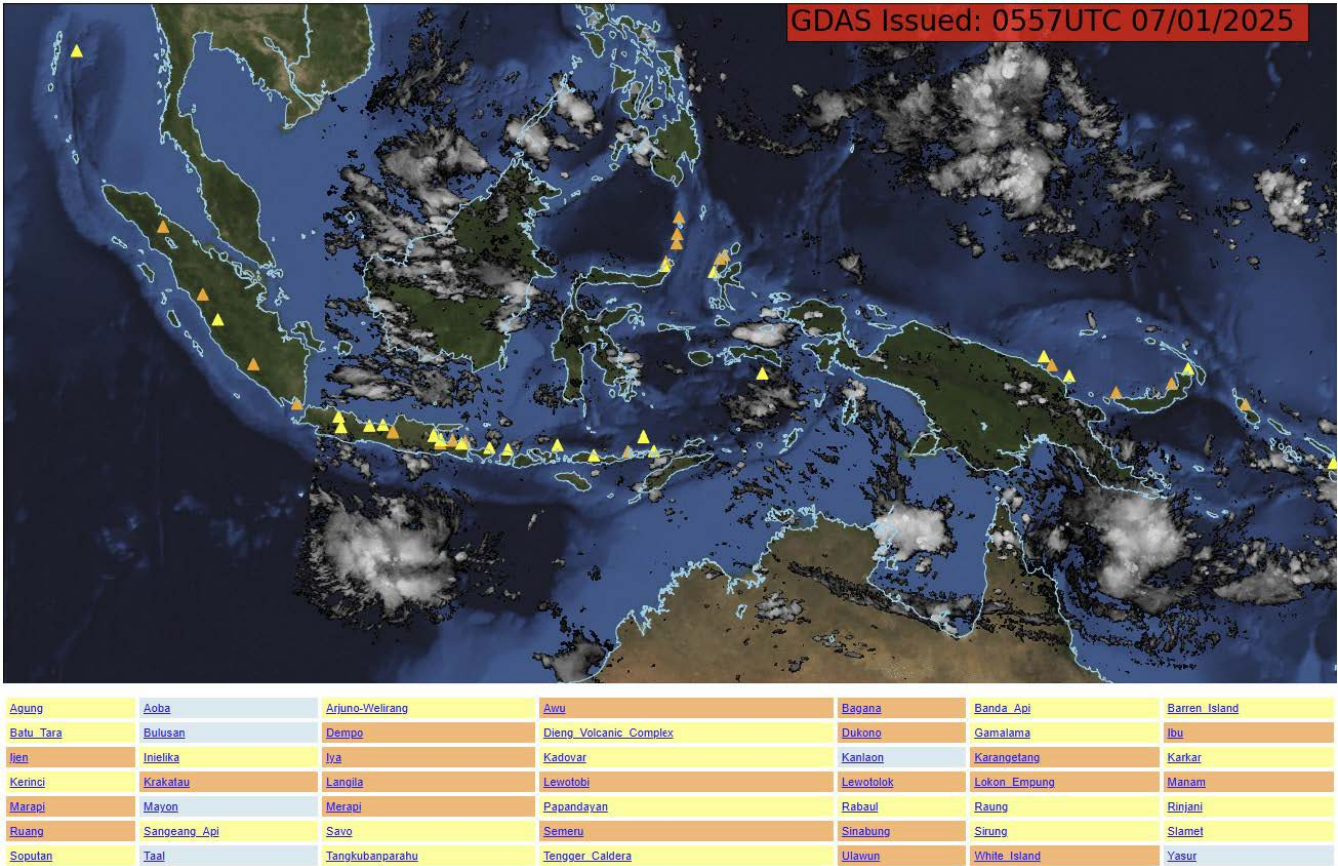
- whether the ash plume is clearly discernible on satellite imagery
- the availability of infrared temperature data of cloud to obtain the height of the ash plume
- correlating observed/model winds through various heights, to observed plume movement
- accompanying ground and/or pilot reports, or reports from other sources.

T+3 forecast

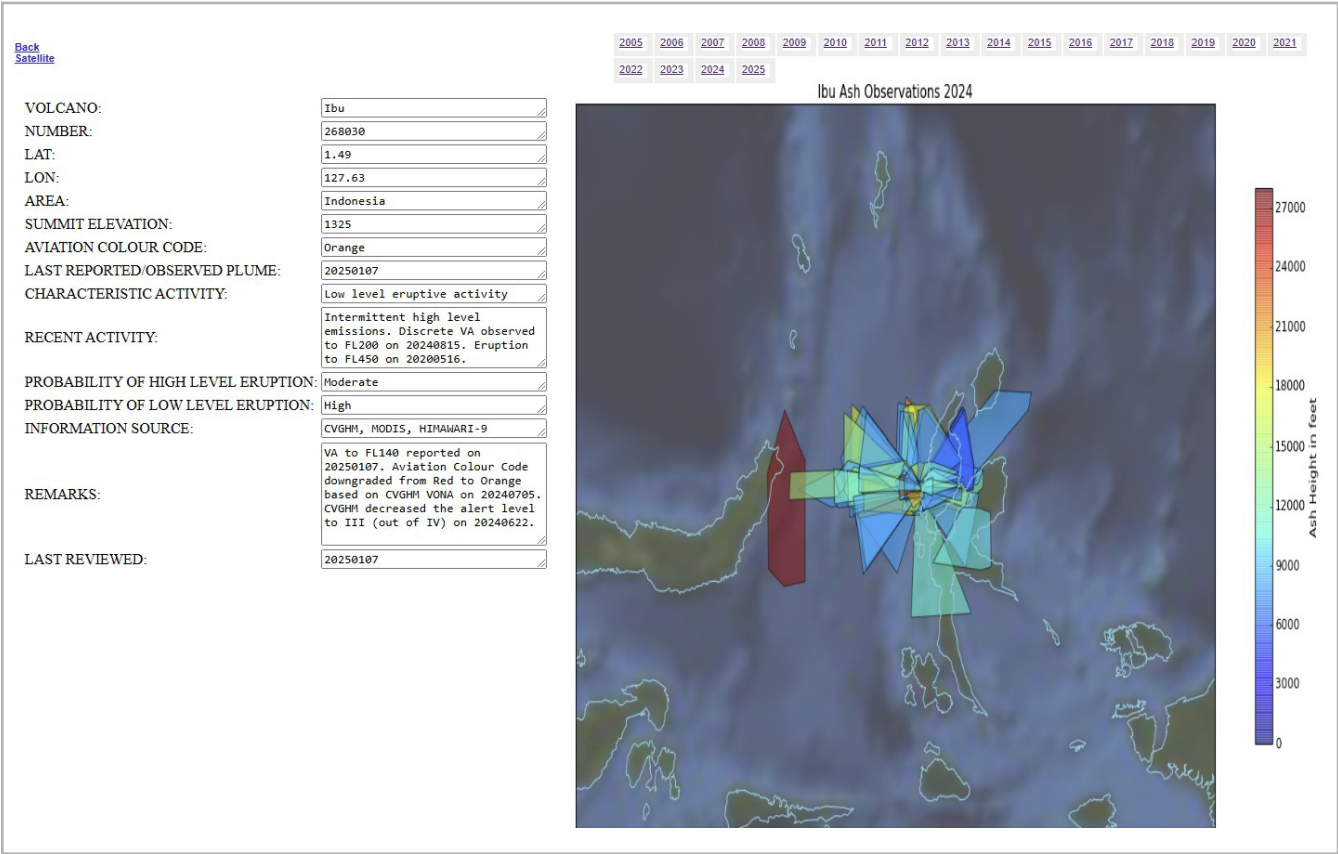
The VASEA product includes a T+3 hour written forecast to help extrapolate between the T+0 observation and T+6 forecast. Factors that influence the T+3 assessment confidence include:

- time of last confirmed observation
- wind regimes
- model guidance and dispersion model output
- volcano source predictability or volcanology of the volcano.

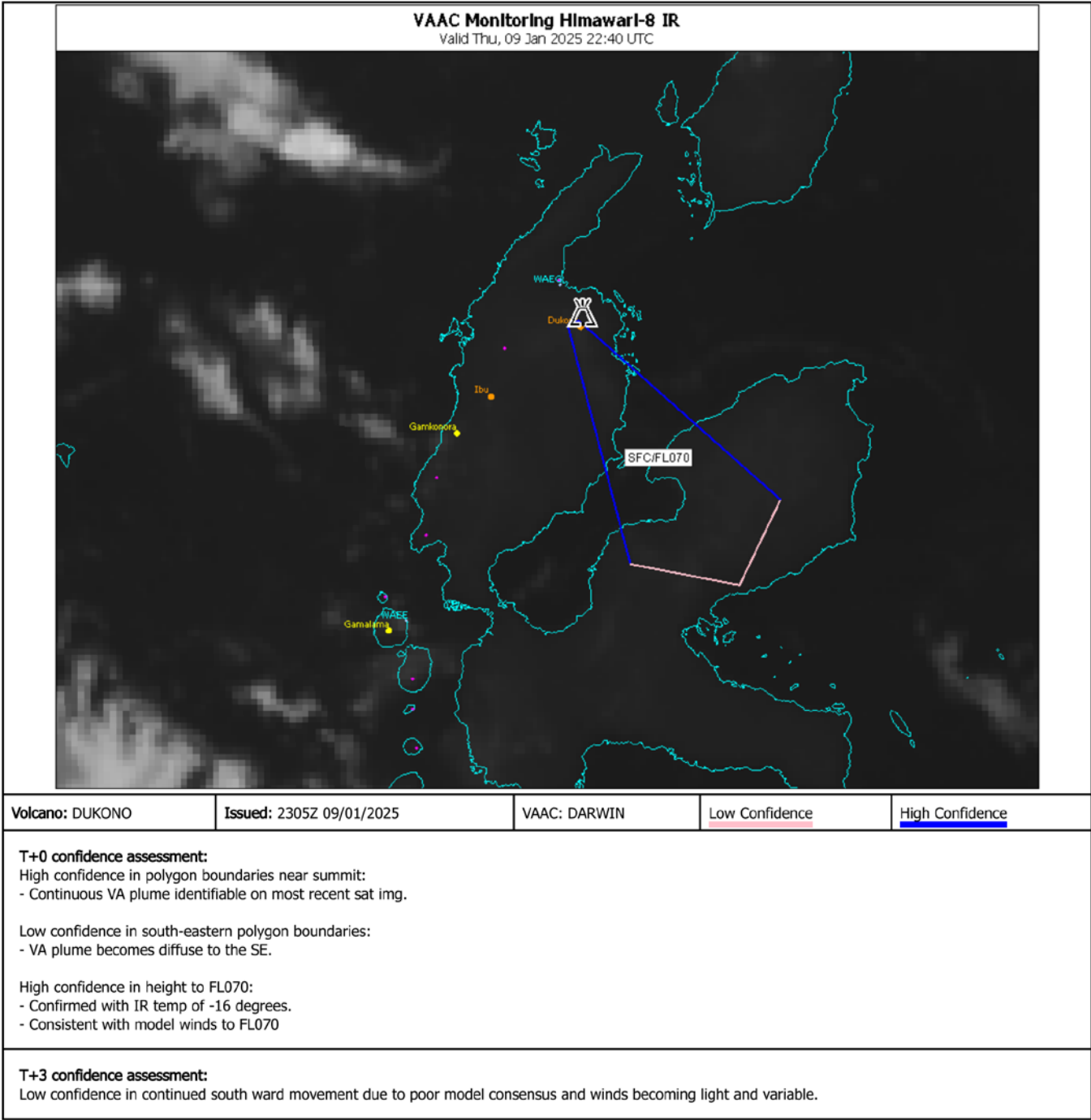
GDAS web interface



GDAS - Ibu ash observations 2024



VASEA example 1



Band 11 - IR: cloud top phase 26.05.2017 14:20

Volcano: MANAM	Issued: 1445Z 26/05/2017	VAAC: DARWIN	Low Confidence	High Confidence
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T+0 confidence assessment:

Possible eruption at Manam due to: anomalous cloud development anchored to volcano, suspect enhancement in RGB imagery, and consistent hotspots.

High confidence in majority section of polygon:

- Discernible signal in RGB imagery at 26/1420z

Low confidence in minor section of polygon:

- Cloud cover obscuring RGB signal

Low confidence in ash cloud top to FL400:

- IR temperature of -50 degrees but not clear reading
- Movement matches model winds but light winds

T+3 confidence assessment:

Low confidence in T+3 assessment of ash moving to west-southwest:

- Two models match movement to west
- HYSPLIT shows slow movement
- Winds are light and variable so no model consensus

Ash height expected to stay at FL400 unless situation becomes clearer.

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A vertical line in the margin indicates a change or addition since last update.