13th Asia-Oceania Meteorological Satellite Users' Conference

Automatic Detection for Volcanic Ash Distribution Using Geostationary Satellite Observation by Machine Learning

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About Me

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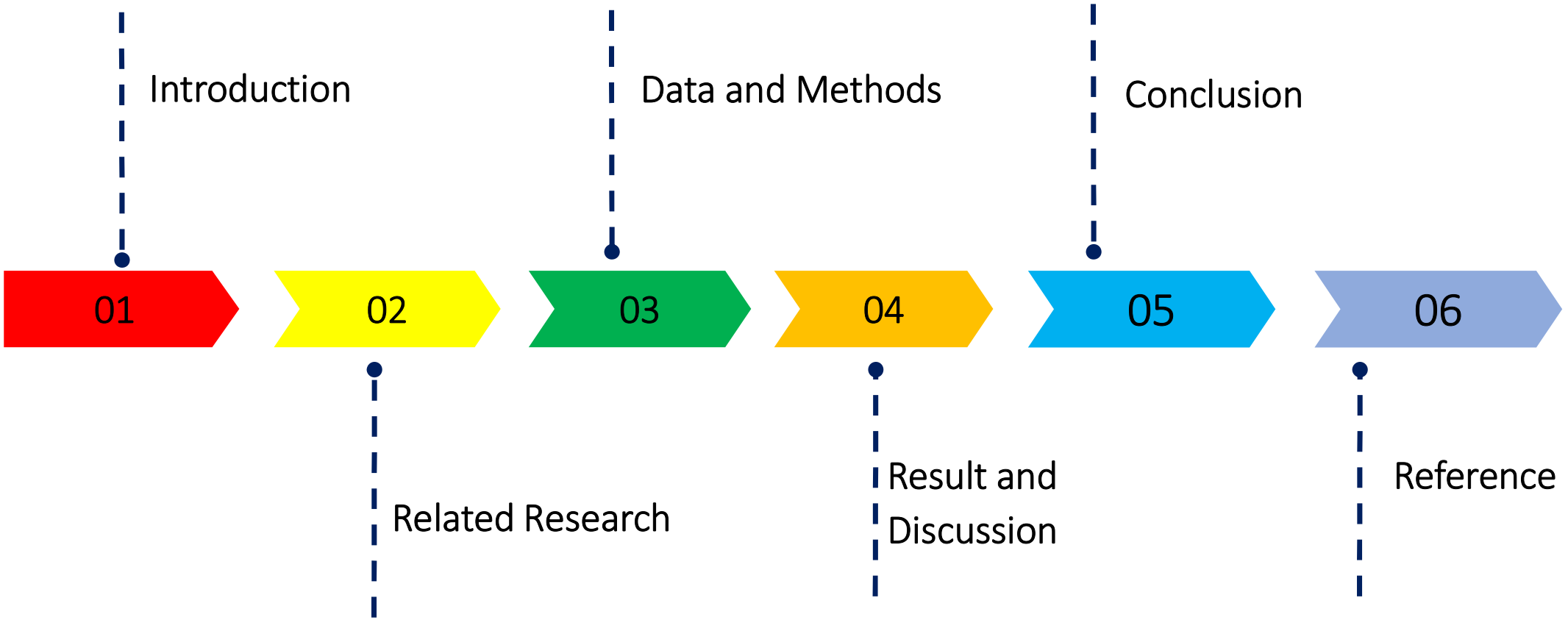
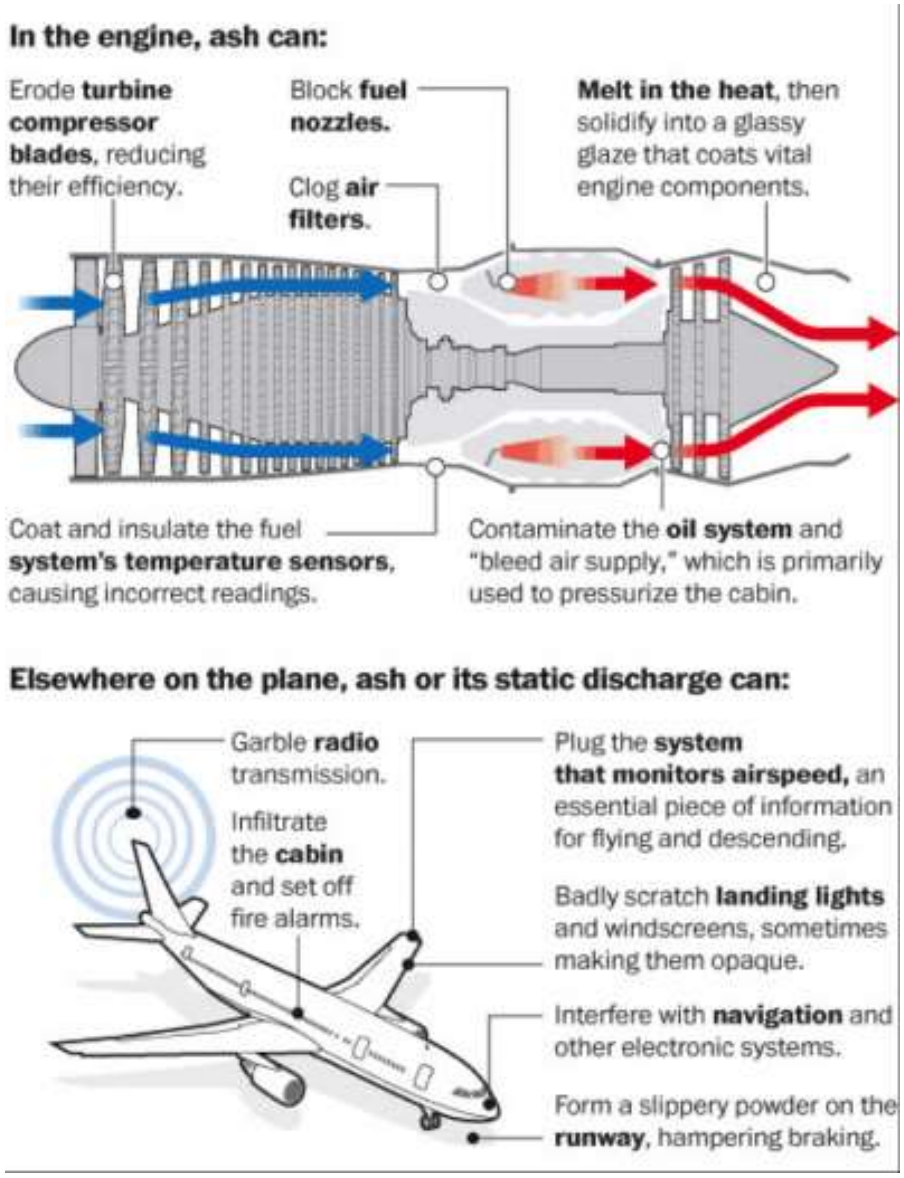
Outline Presentation



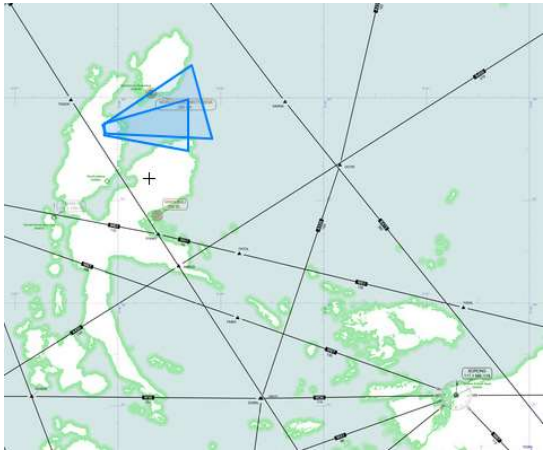


Volcanic Ash is Dangerous for Aviation Transportation

When Volcano Eruption is Happen …..

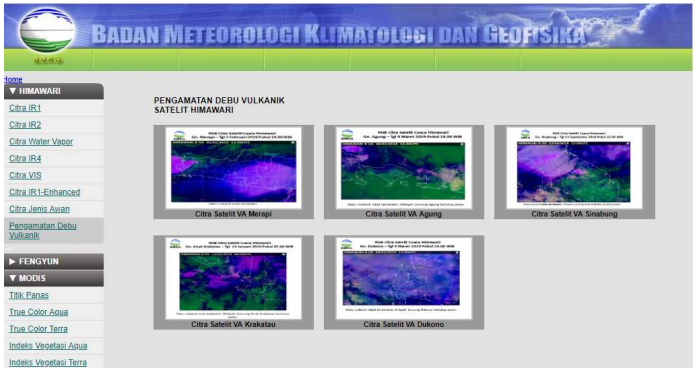
WVID21 WAAA 230102
WAAZ SIGMET 02 VALID 230102/230650 WAAA-
WAAZ UJUNG PANDANG FIR VA ERUPTION MT DUKONO PSN N0141 E12753
VA CLD OBS AT 0050Z WI N0138 E12752 - N0145 E12752 - N0159 E12841 - N
0129 E12841 - N0138
E12752 SFC/FL050
FCST AT 0650Z WI N0139 E12753 - N0144 E12751 - N0218 E12842 - N0219 E
12843 - N0136 E12855
- N0139 E12753=

Close



BMKG Issued SIGMET of VA

Volcanic Ash distribution Product from BMKG



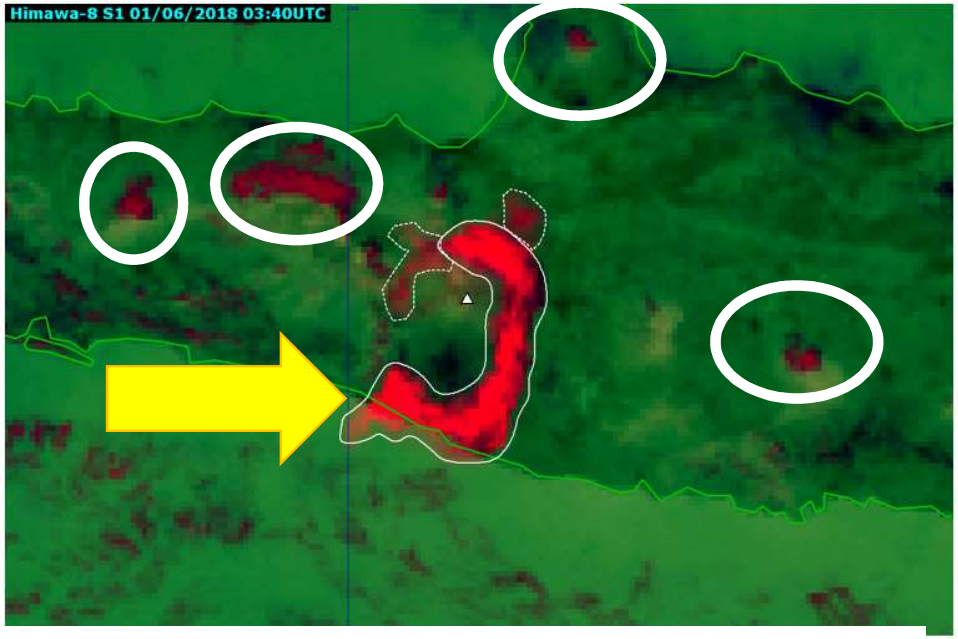
We want to make the all of them become

Automatic

Objective

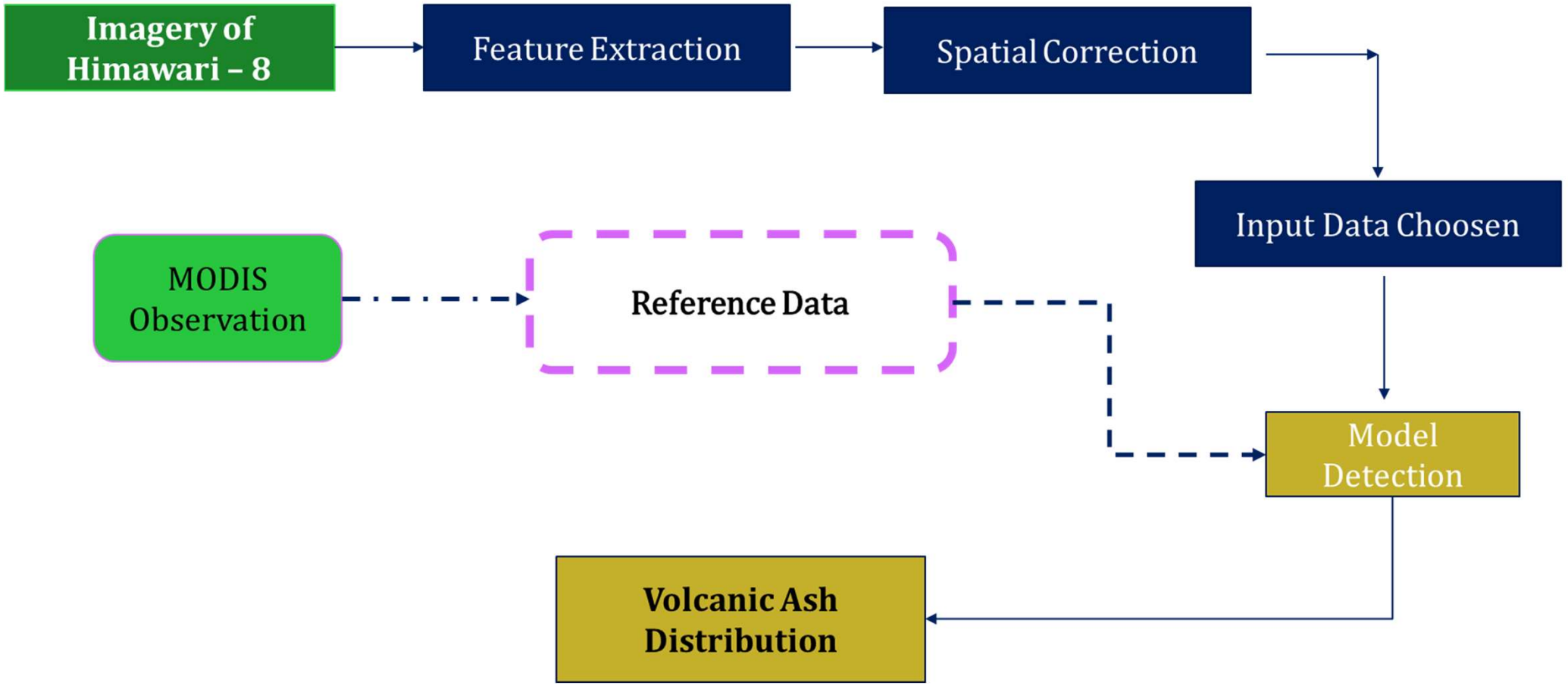
BMKG

RGB Citra Satelit Cuaca Himawari
Gn. Merapi - Tgl 1 Juni 2018 Pkl. 10.40 WIB

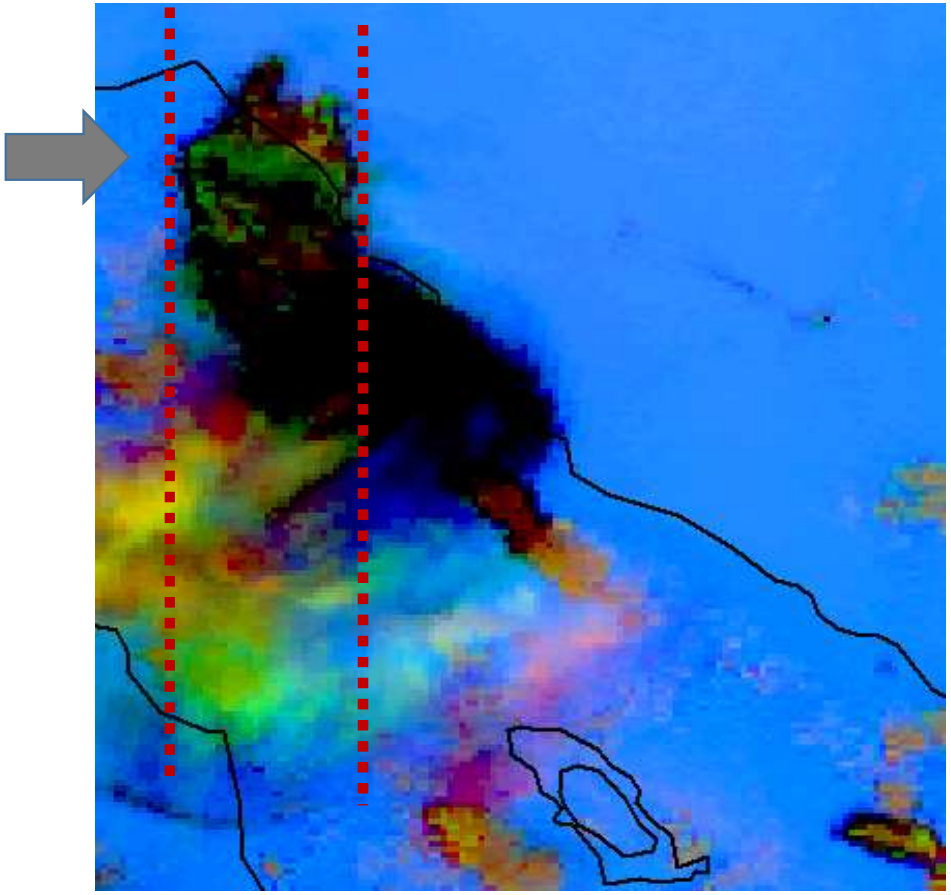


Still Need Expert Interpretation from
Forecaster on Duty (FOD)

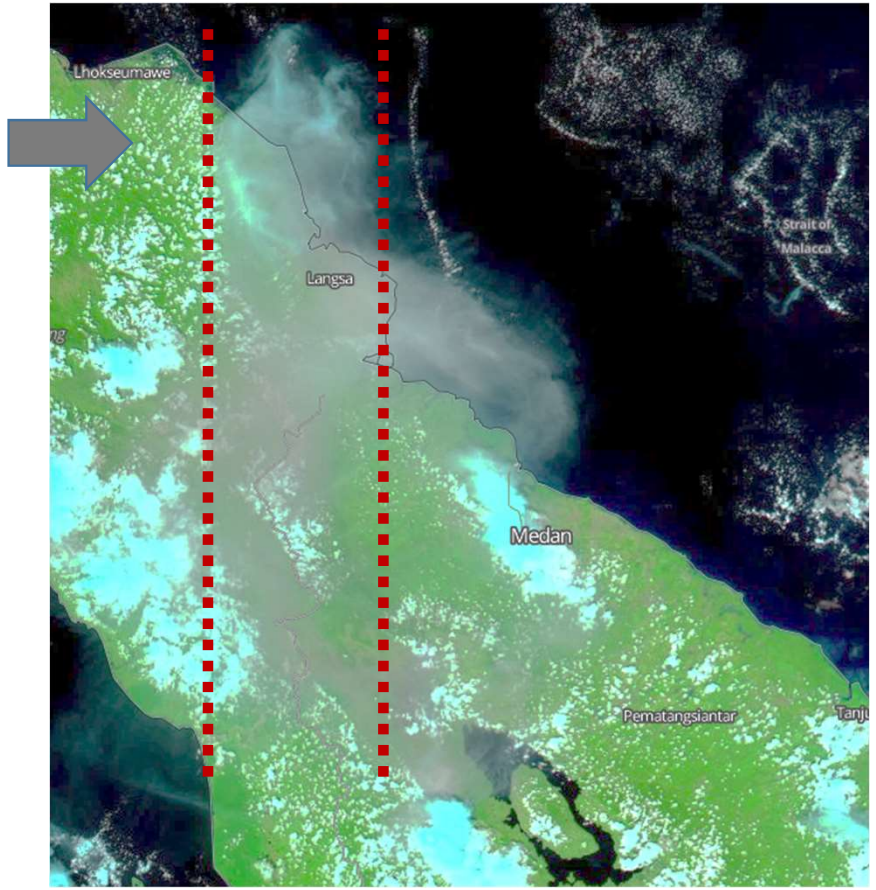
Block Diagram of System



Comparation of Himawari – 8 and MODIS

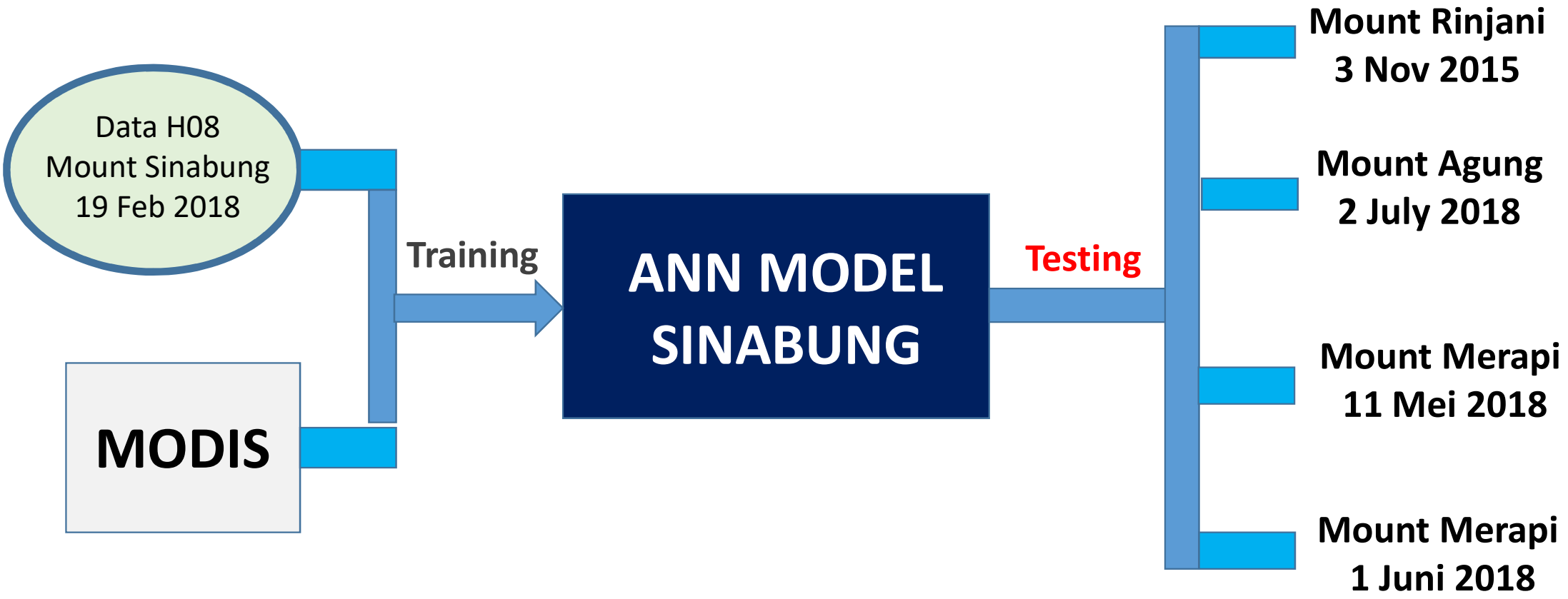


RGB Himawari – 8



Natural Color MODIS

Experiment of Research

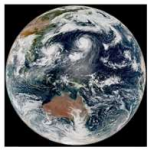


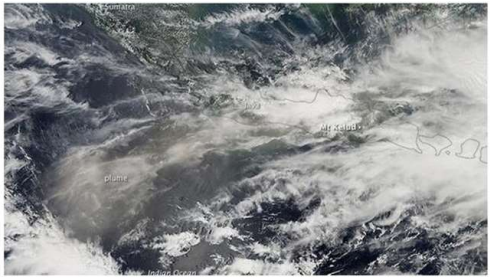
Research's Step

1

Choose the Case Study

2



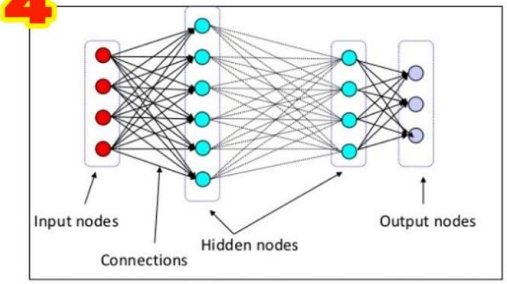


Preparing Satellite Data

3

Make interpretation of the volcanic ash location for Model Target

4

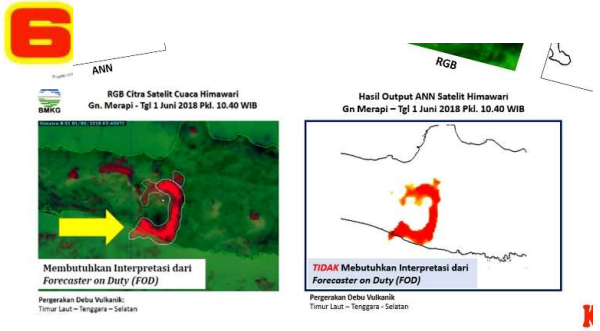


Design the Architecture of Neural Network Model

5

Training Process with Neural Network Model

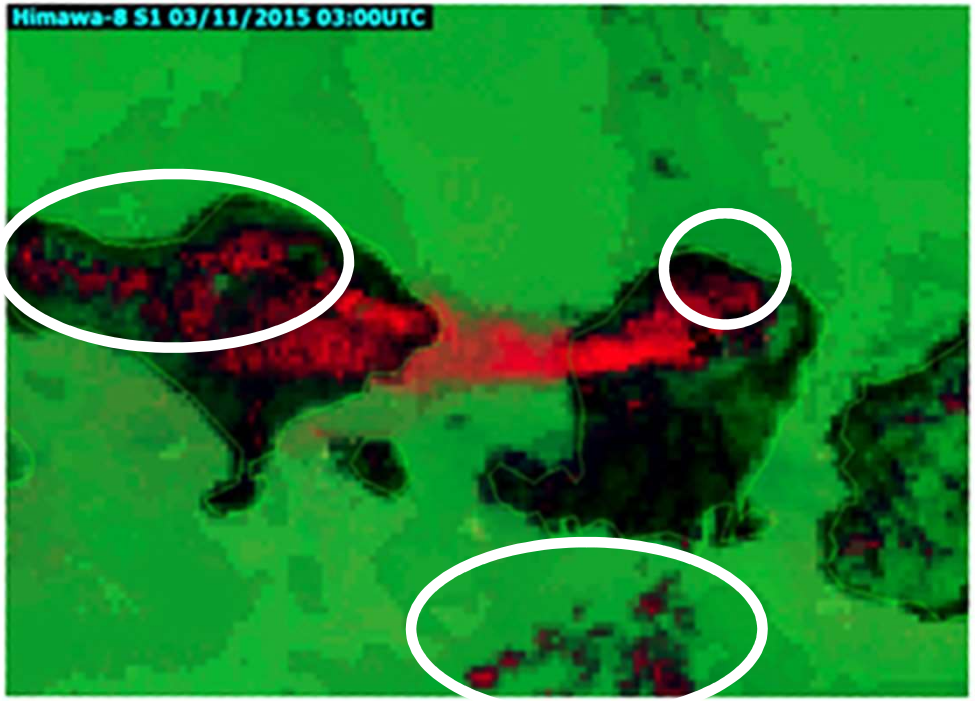
6



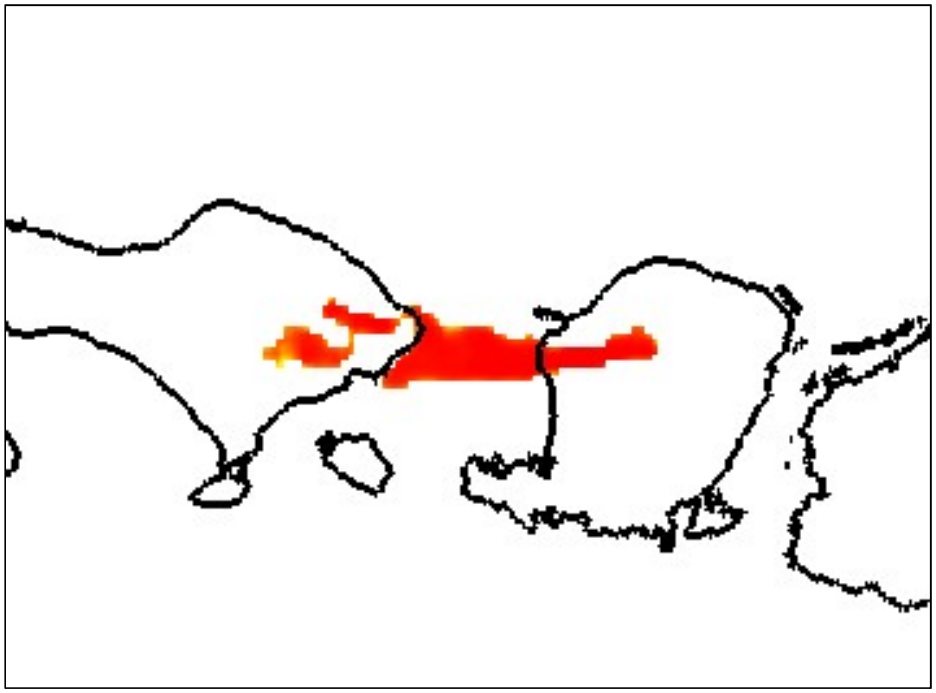
Testing the Model to New Data

RESULT OF VOLCANIC ASH DISTRIBUTION

Eruption of Mount Rinjani 3 Nov 2015_03.00 UTC

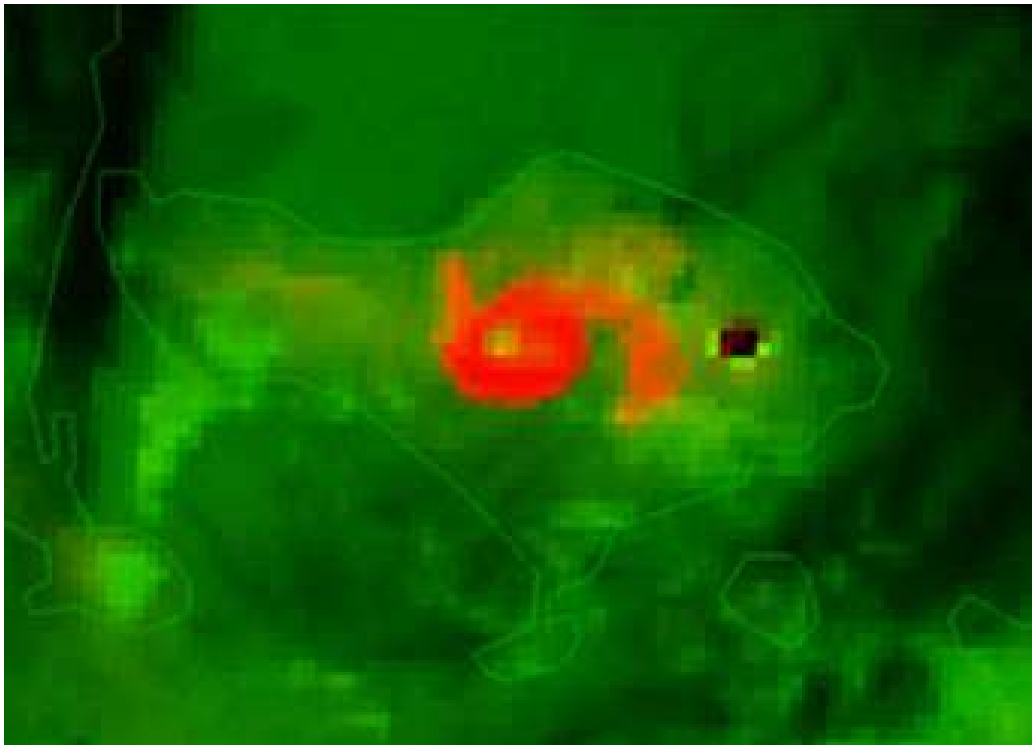


RGB Recipe from BMKG

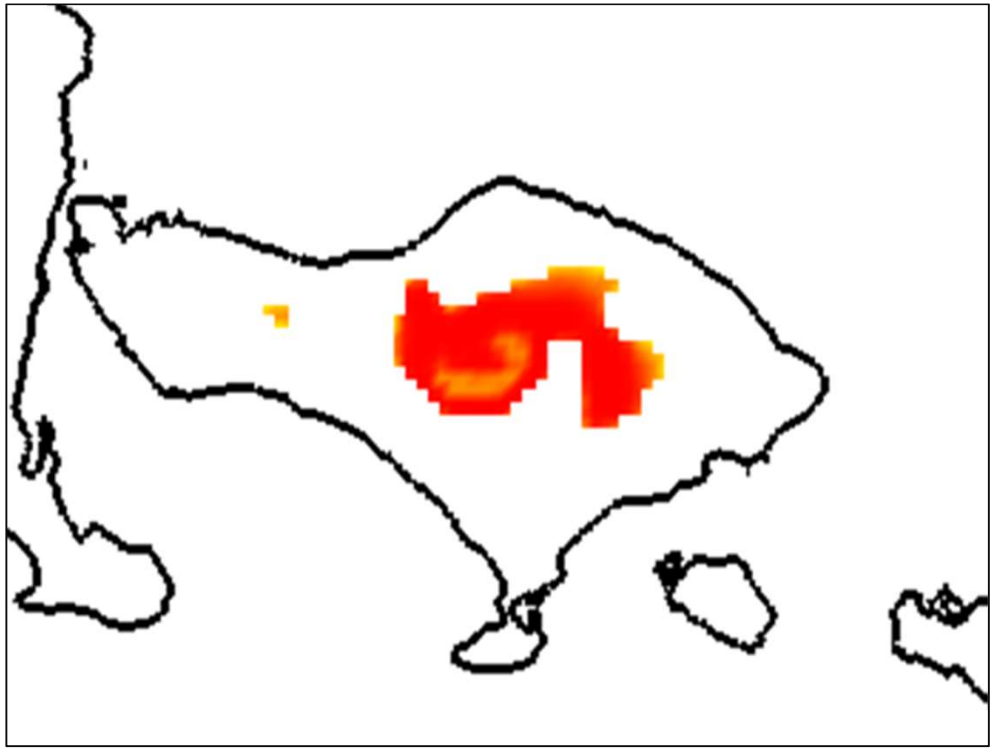


Automatic Detection of Volcanic Ash

Eruption of Mount Agung 2 July 2018_14.00 UTC

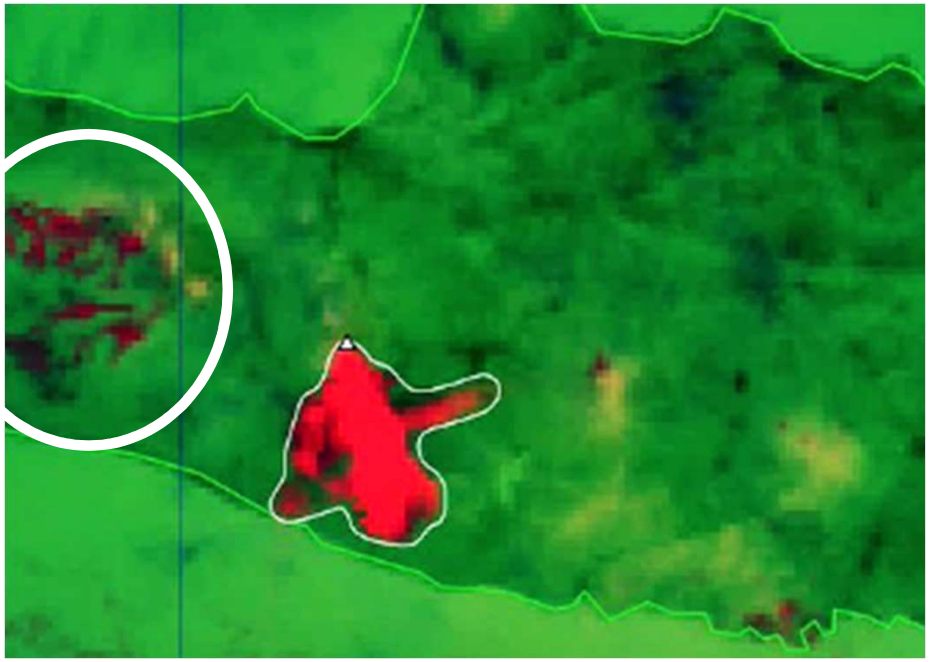


RGB Recipe from BMKG

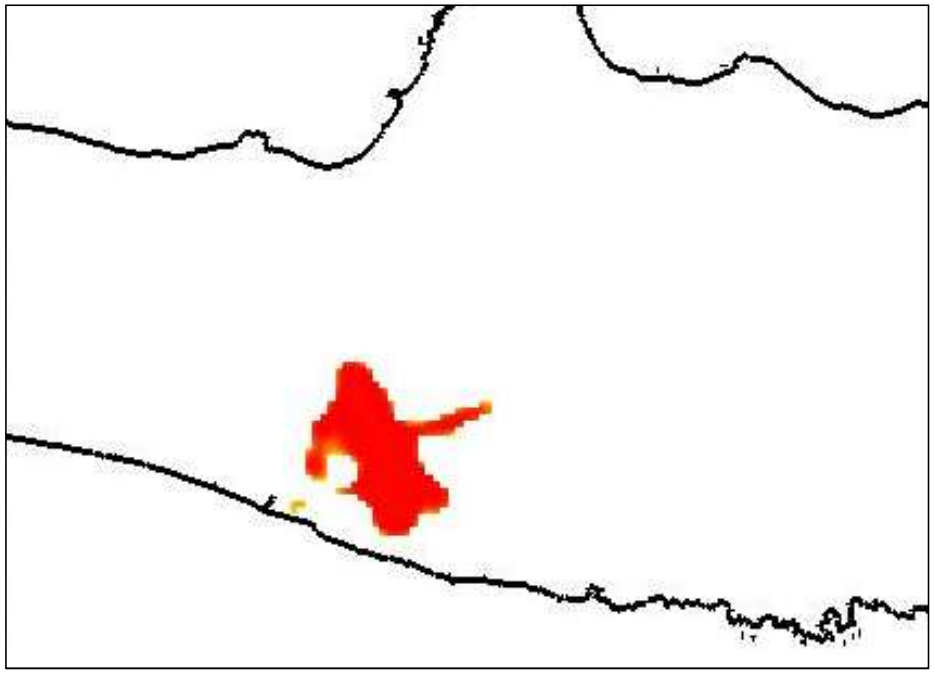


Automatic Detection of Volcanic Ash

Eruption of Mount Merapi 11 Mei 2018_0300 UTC



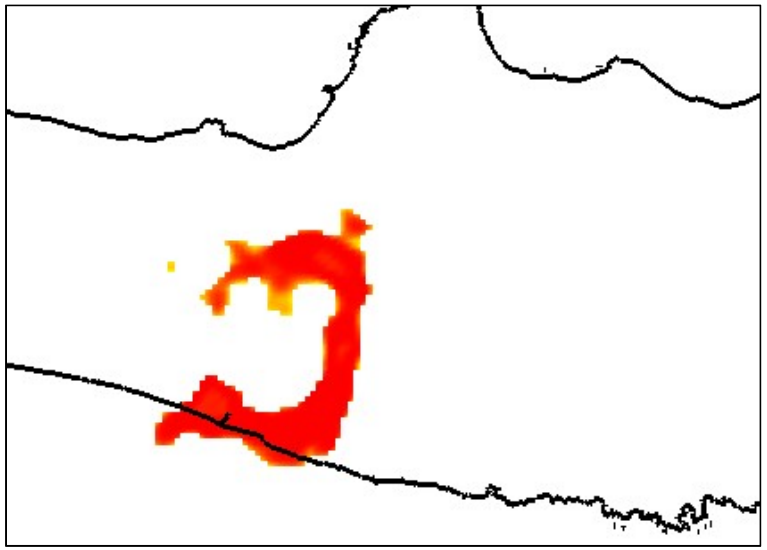
RGB Composite Recipe



Automatic Detection of Volcanic Ash

Eruption of Mount Merapi 1Juni 2018_0340 UTC

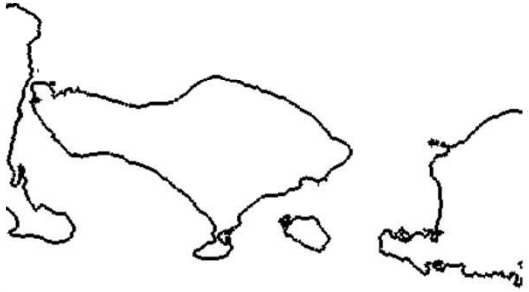
RGB Composite Recipe



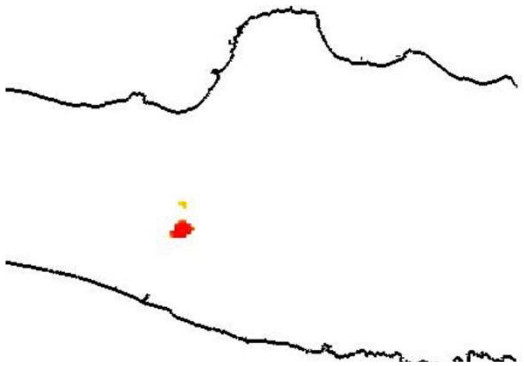
Automatic Detection of Volcanic Ash

Animation of All Eruption

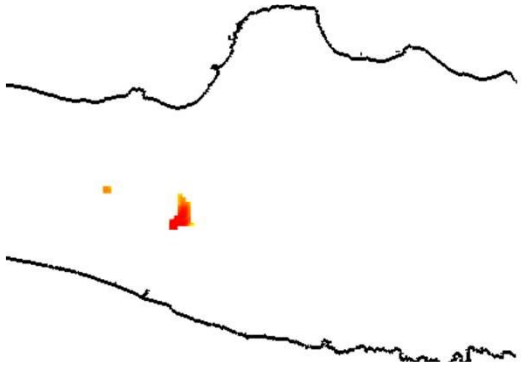
Eruption of Mount Rinjani 3 Nov 2015



Eruption of Mount Agung 2 July 2018



Eruption of Mount Merapi 11 Mei 2018



Eruption of Mount Merapi 1Juni 2018

Conclusion

- Based on the result, volcanic ash distribution from Neural Network Model have a same pattern with the RGB Recipe that used in BMKG

- In the case study, automatic product can directly distinguish which one the volcanic ash or not. Anything other than volcanic ash **will not be displayed** on this product.

Agency for Meteorology Climatology and Geophysics

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BMKG

THANK YOU


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