WEATHER RADAR OBSERVATIONS OF SAKURAJIMA VOLCANIC SMOKE

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BACKGROUND
- Passive methods
- Weather radar can detect volcanic smoke
- Usage of weather radar for ash forecasting

PURPOSE
- What information can weather radar retrieve?
- Structures of eruption columns and ash clouds

OUTLINE
- Historical review
- Observations of Sakurajima volcano
- Results of two case studies
- Conclusions and future plan
DATA AND ANALYSIS METHOD

DATA
• Case 1: Aug. 18, 2013
  Volume scan data of X-band polarimetric radar
• Case 2: May 10, 2014
  Volume scan data of X-band polarimetric radar
  RHI and PPI data of Ka-band Doppler radar

ANALYSIS METHOD
THREE DIMENSIONAL RADAR DATA ANALYSIS TOOLS OF VOLCANIC by Maki et al.,
IUGG 2015, Poster VS17p-104

CASE 1
Sakurajima
2013/08/18/16:31 JST
Echo top : 5000m (from vent)
TIME:1631-1713 JST

BIRD’S EYE VIEW

Operational X-band Polarimetric Radar
Location and observation area of X-band polarimetric radar of MLIT.

Ka-band Doppler Radar (NIED)
Location and observation area of Ka-band Doppler radar of NIED.

RESULTS
Case 1: Aug. 18, 2013
16:32-17:30

Accumulated Reflectivity

Case 2: SAKURAJIMA, MAY 10, 2014
Ash column height: 4500 m from vent

Inner Structure
2013/08/18/16:31 JST

Time Change

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<tr>
<th>5 min</th>
<th>7 min</th>
<th>9 min</th>
<th>15 min</th>
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Web camera from the west of Sakurajima
Report from JMA
Explosive Eruption at 13:07 JST, May 10, 2014
Ash column height: 4500m from the crater
Air shocks, volcanic rocks (the 3rd uphill)

SUMMARY
Updraft ~30m/s
CONCLUSIONS AND FUTURE WORK

Conclusions:
- Weather radar data of two explosive eruptions are analyzed.
- Weather radar can give us useful information on structure of ash column.
- Ka-band Doppler radar give us information with high spatiotemporal resolution.

Future work:
- More quantitative analysis.
- Statistical analysis by 31 eruption cases in 2013.
- Potential of polarimetric parameters.