**INTRODUCTION**

For more than 30 years, the BMKG and CEA institutes have been collaborating to implement and improve geophysical networks for detection and characterization of natural phenomena such as earthquakes. Scientific collaboration between the BMKG and the CEA in the field of seismology started in the 1980’s, and more recently in the field of infrasound with the installation of the experimental stations in Palangkaraya, Pelabuhan Ratu and Tondano.

Infrasonic waves propagate in the atmosphere over very large distances. As waves propagate in the upper atmosphere, the wave front characteristics reveal, in addition to information about the source, significant features of the vertical structure of the winds. The interpretation of these data has motivated studies on sources of infrasonic waves and their propagation in the atmosphere. Infrasonic waves from geophysical phenomena have been observed since early last century. The volcanic activity is one of those natural phenomena that are well observed on infrasound networks. The volcanic activity is very important in Indonesia where about 120 active volcanoes are counted (Figure 1). Besides the dramatic aspect of this activity, the Indonesian volcanic arc offers a potential number of important infrasonic sources distributed over time and space. Monitoring infrasound from volcanoes may provide relevant information about ash injection in the atmosphere when satellite information is not available, because of cloud coverage. The International Airways Volcanic Ash Advisory Centres (IAVAA) supported by the International Civil Aviation Organization encourages the development and utilization of infrasound data in support of the Volcanic Ash Advisory Centres (VAACs). The interest of the infrasound technology to mitigate the impact of ash clouds on aviation is widely recognized. In addition to the study of the atmosphere the infrasound technology allows to characterize the different sources.

**RESULTS**

**PALANGKARAYA AIRPORT**

Figure 2 shows examples of PMCC processing results using infrasound measurements at Palangkaraya station during 7 months of operations (February-September 2005). Each diamond corresponds to a signal detection and its color (light scale, from 0 to 1.5 Hz) corresponds to the frequency of the detected signal. Narrowing the focus on the month of March 2005, the figure shows continuous and stable detections from distinct azimuths that correspond to the direction of several volcanoes:

- Pinatubo (azimuth=19.9°, distance=2050 km),
- Semeru (azimuth=189.8°, distance=660 km),
- Krakatau (azimuth=245.2°, distance=1040 km),
- Balok (azimuth=275.2°, distance=1480 km),
- and Barren Island (azimuth=306.5°, distance=2740 km).

**CONCLUSION**

The Palangkaraya experiment has clearly demonstrated the potential of infrasound data for monitoring atmospheric changes and sources related to volcanic activity. The central location of the station in Kalimantan was favorable for efficient distant observations and categorization of volcanic eruptions from the island arc. During the few months of operations, the station has permitted to associate a large number of detections to known active volcanoes from distances of 660 km (Semeru) up to 2740 km (Barren Island).

After moving to Pelabuhan Ratu near Jakarta, the experimental station has started to produce a very large number of detections. The infrasound station has been operating in sub optimal conditions, since it is located in a noisy infrasonic background and its small aperture makes it sensitive to any local/regional natural and man-made sources. The small aperture of the Pelabuhan Ratu array also has a negative impact on the accuracy of the infrasound measurements (azimuth, horizontal trace velocity).

The purpose of Tondano survey was to acknowledge if the presence of active volcanoes in a 30km radius from the station would be severely interfering in infrasound data recording and processing. The experiment proved that there was no permanent noise produced in the detection bandwidth (0.1Hz – 4Hz) that would mask other detections, which confirm the feasibility of setting up a station in the area.

This infrasound pioneer project, result of the collaboration between BMKG and DASE has proven the interest of continuing and developing infrasound technology in Indonesia. The survey in Tondano should lead in the near future to the installation of an Infrasound station in that area and may be the initial step of the development of an Indonesian Network. An infrasound network of 6 to 10 stations in Indonesia would permit to carry out effective infrasound monitoring with a good spatial resolution, and to produce a complete regional infrasound bulletin.