

EARTH OBSERVATION SYMPOSIUM (B1)
Towards Implementation of GEOSS (6)

Author: Mr. Qiongqiong Lan

China Aerospace Science and Technology Corporation (CASC), China, lanqiongqiong@126.com

RESEARCH ON DETECTING CO₂ CONCENTRATION USING REMOTE SENSING DATA

Abstract

Satellite measurements of the distribution of the global atmospheric CO₂ would get its continuous change. The atmospheric infrared sounder (AIRS) enables us to monitor the global distribution and transport of middle troposphere CO₂. Mount merapi is an active strato-volcano located on the border between central java and yogyakarta, indonesia. Annual trend and seasonal changes of the CO₂ concentration has been monitored in situ since the mid-1950s. An earlier study compared the monthly seasonal variations of AIRS retrievals to Matsueda airborne measurements.

In this paper extensive work was carried out to support the AIRS mid-troposphere CO₂ products as well as validating with airplane measurements before released. We used four ground-based stations' measurements available at the World Data Centre for Greenhouse Gases(WMMO WDCGG) web site(<http://gaw.kishow.go.jp/wdcgg.html>) to validate the AIRS daily products. As we used the AIRS mid-troposphere CO₂ to represent troposphere CO₂ concentration, the stations which were to validate the AIRS products should have high altitudes. Therefore, we chose four stations around the world whose altitudes are more than 2000m. The AIRS data were acquired from 15th october to 15th november in 2008, 2009 and 2010 to monitor the temporal-spatial distribution of erupted CO₂ from the volcano. Mid-tropospheric CO₂ concentration would increase gradually and reach its peak in one day from eruption. The dispersal range of erupted CO₂ was -7.54083175, 110.4448175 in the graticules centering around gunung merapi. Having a high correlation with the eruptions, the mid-troposphere CO₂ concentration of 2010 showed different trend comparing with 2008 and 2009 trend. The 4-day CO₂ concentration data of 2010 over the volcano tended to increase by 2.9 ppmv and 4.1 ppmv comparing with that of 2009 and 2008 respectively. These observations provide the evidence that extensive release of CO₂ occurs during the volcano eruption time and using the AIRS CO₂ products to monitor the temporal-spatial distribution of erupted CO₂ from volcanoes is possible.