POTENTIAL USE OF IASI FOR VOLCANIC CLOUDS
DETECTION AND MONITORING
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NEEDS
• LAVALTS : Impact of SO2 and Stratospheric aerosols on climate.
• AERIAL SAFETY
The danger resulting from volcanic explosion has justified the opening by OACI of 9 Volcanic Ash Activity Centers (VAAC) in charge of monitoring and alert

OBJECTIVES
• Mapping of sulfur dioxide or aerosol. Mass loadings, conversion SO2 to H2SO4 transport, deposition, Radiative properties.
• Identification of ash, amount, altitude, transport

SATELLITE MONITORING
Current status
Satellite is the unique tool
Data Used :
GOES, AVHRR, TOMS, HIRS
SEVIRI, SCHIAMACHY, AIRS

WHAT IASI COULD BRING ?

IASI
• Fourier transform spectrometer on Metop
• >15 years of high quality data
• Spectral range: 2760 to 645 cm
• Spectral resolution: 0.35 to 0.5 cm
• Radiometric performances
• Spatial sampling

SIMULATIONS
SO2 only
Modeling Radiances
• IA (version 4AOP) Includes continuum (CKD2.0), H2O, CO2, N2O, CO, CH4, SO2, HNO3, CFCS.
• Simulation for HIRS 3 (NOAA 16), AIRS, IASI.
• Profiles P.T.U from Raob Tunis 28/09/02 02Z.
• 10 profiles SO2 around 8 km for sensivity study

SO2 DETECTION AND CHARACTERIZATION WITH IASI
• Use channels at 1158, 1589, 2500 cm
• Use microchannel at 1250 cm
• Maps of SO2: Th2<1250, 1250<1325, 1325<1395, 1395<1465, 1465<1535, 1535<1605
• Denoising: IA (LAI) or evaluate amount is high, mean or low.
• Baseline estimate with different methods:
  – Local Differential absorption
  – Contour with clear pixels
  – Differential absorption with near-near
• Then, with the retrieved column and the retrieved temperature profile, estimate radiances at 1350 with alifinice MA levels. Select by minimization.

AEROSOLS

IASI versus AIRS

Having a better resolution than AIRS and a better spectral coverage of SO2 bands IASI is very promising for volcanic activity and climate monitoring