

VOLCANO MONITORING IN NEAR REAL-TIME USING ENVISAT AATSR

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1. INTRODUCTION

The Along Track Scanning Radiometer (ATSR-2) on board the ERS-2 satellite has demonstrated to be very valuable to global volcanological research and surveillance applications. Early 2000, a prototype service was developed and put into operations at ESA to monitor in near real-time the thermal activity of more than 100 volcanoes worldwide. The prototype based on a theoretical orbiting model was unfortunately discontinued early 2001 after the failure of the digital earth sensor of the spacecraft. Using AATSR (Advanced ATSR) flying on board the Envisat spacecraft, this near-real-time service called Volcanoes Monitoring by Infra-Red (VoMIR) was revived with enlarged coverage of over 400 volcanoes, improved algorithm and appealing end-user tools for data display.

Using AATSR data, the VoMIR service aims at providing a global-scale thermal mapping of volcanic activity, specifically targeting the real-time publishing of geothermal instant observations over every volcano, together with long-term trends pertinent to monitoring the activity along time. The VoMIR products are primarily intended to serve science research bodies involved in volcanology, global geothermal studies and geology.

VoMIR processing is performed on ESA's multipurpose Grid Processing-on-Demand Environment (G-POD) This is a GRID-based operational environment able to process large amounts of remote sensing data in an efficient way. The access to ESA data catalogue coupled with high-performance and sizeable computing resources managed by GRID technologies, enables the user to develop applications that were not feasible till now.

The VoMIR products can be visualized and downloaded freely from Internet at <http://vomir.esrin.esa.int/> The whole ENVISAT mission from year 2003 onwards is available for retrieval and is updated with every new ENVISAT overpasses over the volcanoes.

Soon after data acquisition, results are made publicly available on the web. The user can select the volcano or volcanoes of interest from a world map or a list of all the volcanoes available, select the time interval to retrieve and visualize or download all the records available from the server through a webpage. There are different types of products available:

1.1. Excel Output

All detailed measurements are provided under the form of an Excel spreadsheet per volcano compiling all measures, statistics, quality indicators and quick look images corresponding to each observation. This output allows in particular other correlations and graphs to be further created using Excel functionality.

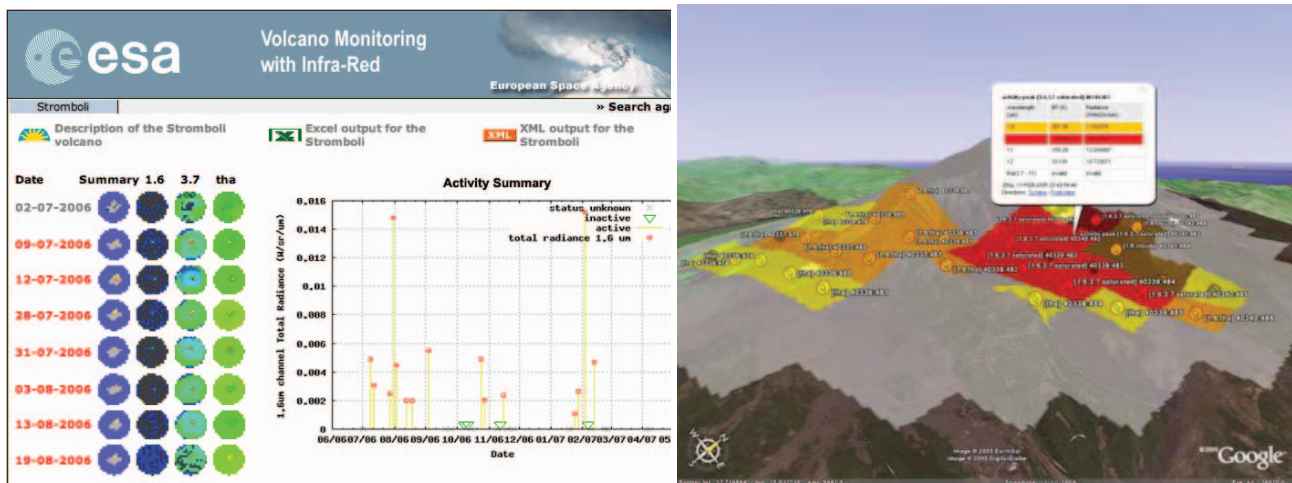


Fig-1 VoMIR output sample. Left: Output Webpage. Right: Google Earth summary over Etna, 11th Feb 2005

1.2. Excel Output

Each VoMIR observation can be additionally displayed in the Google Earth Client. This powerful tool makes it a real asset for displaying and sharing geographical information. The AATSR observations at 1km resolution can be displayed together with the VoMIR elaborated data over each pixel in documented Placemarks overlaid on the map view. This powerful feature allows a close verification of the algorithm results

1.3. XML Products

All the information obtained by the VoMIR algorithm is stored using an XML format for an easier retrieval and processing by automated means.