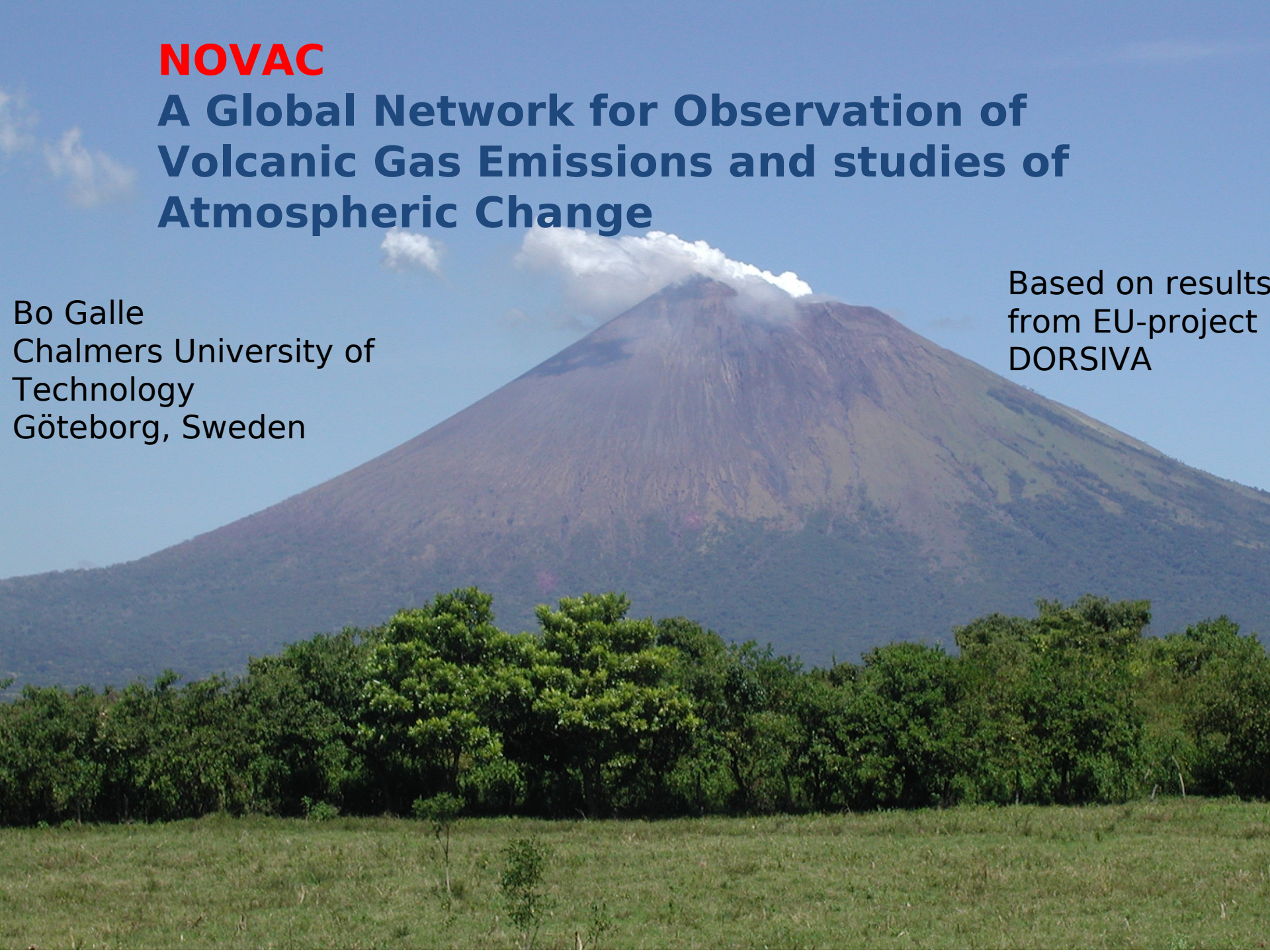


NOVAC
A Global Network for Observation of Volcanic Gas Emissions and studies of Atmospheric Change

Bo Galle
Chalmers University of Technology
Göteborg, Sweden

Based on results from EU-project DORSIVA

DORSIVA

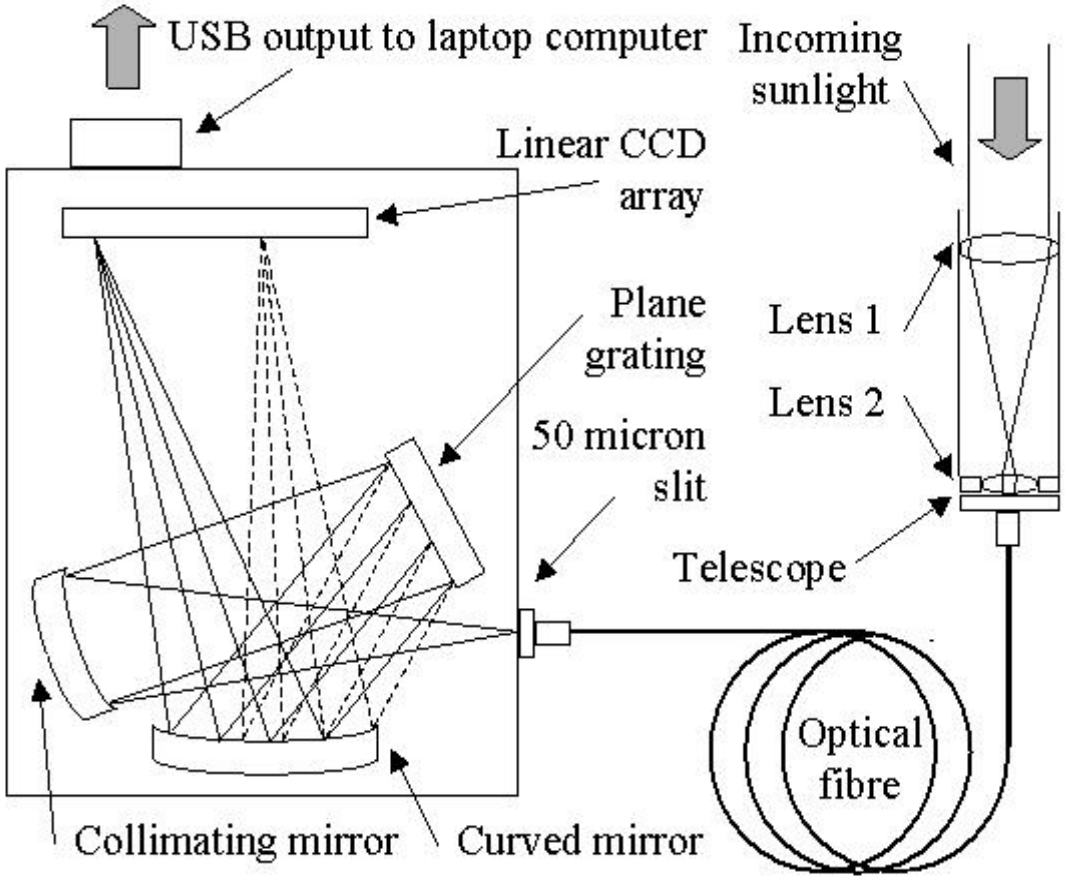
Development of Optical Remote Sensing Instruments for Volcanic Applications

EU-project 2002 - 2005

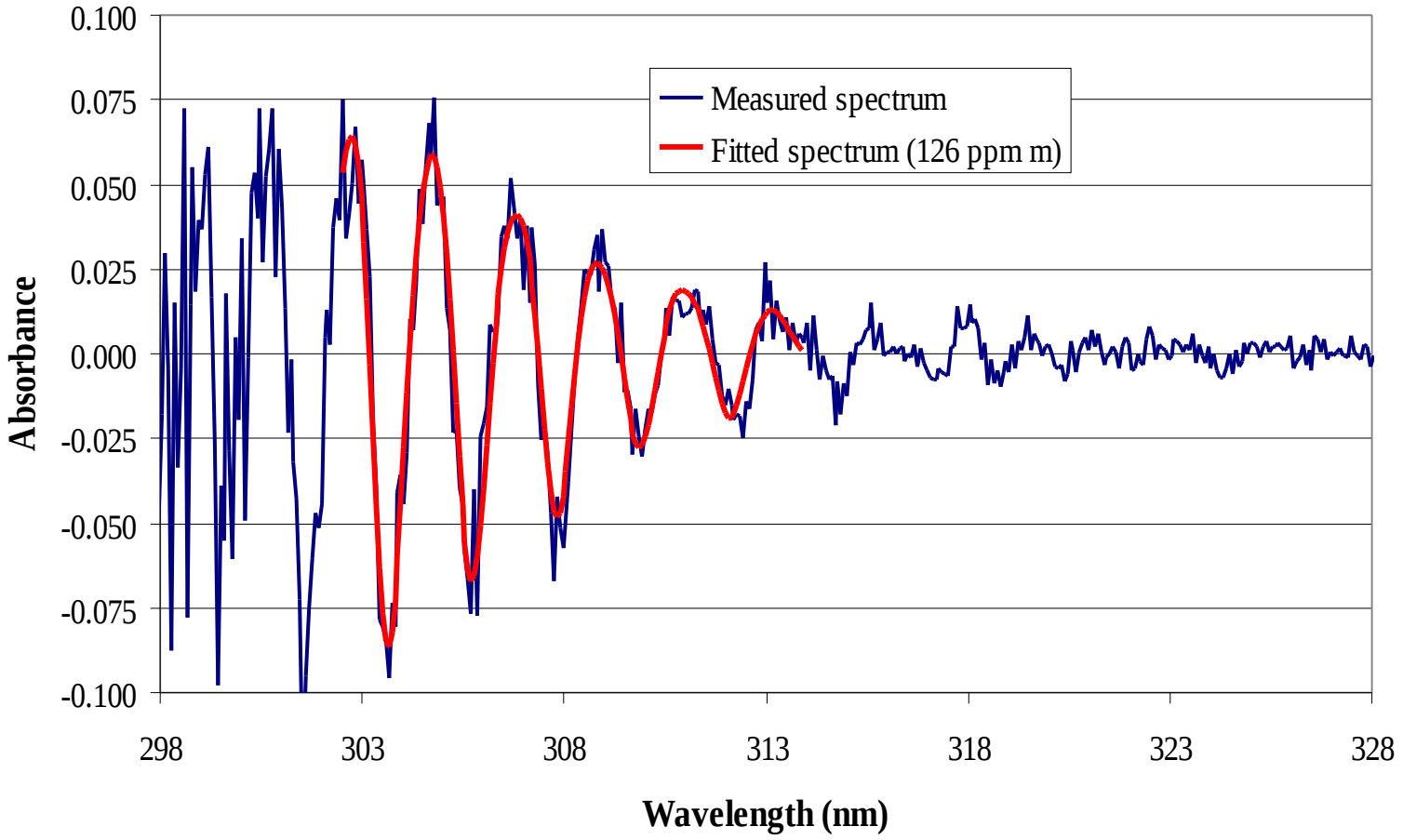
Aim:

To develop robust and reliable optical remote sensing instruments and measurement strategies for surveillance of volcanic gas emissions

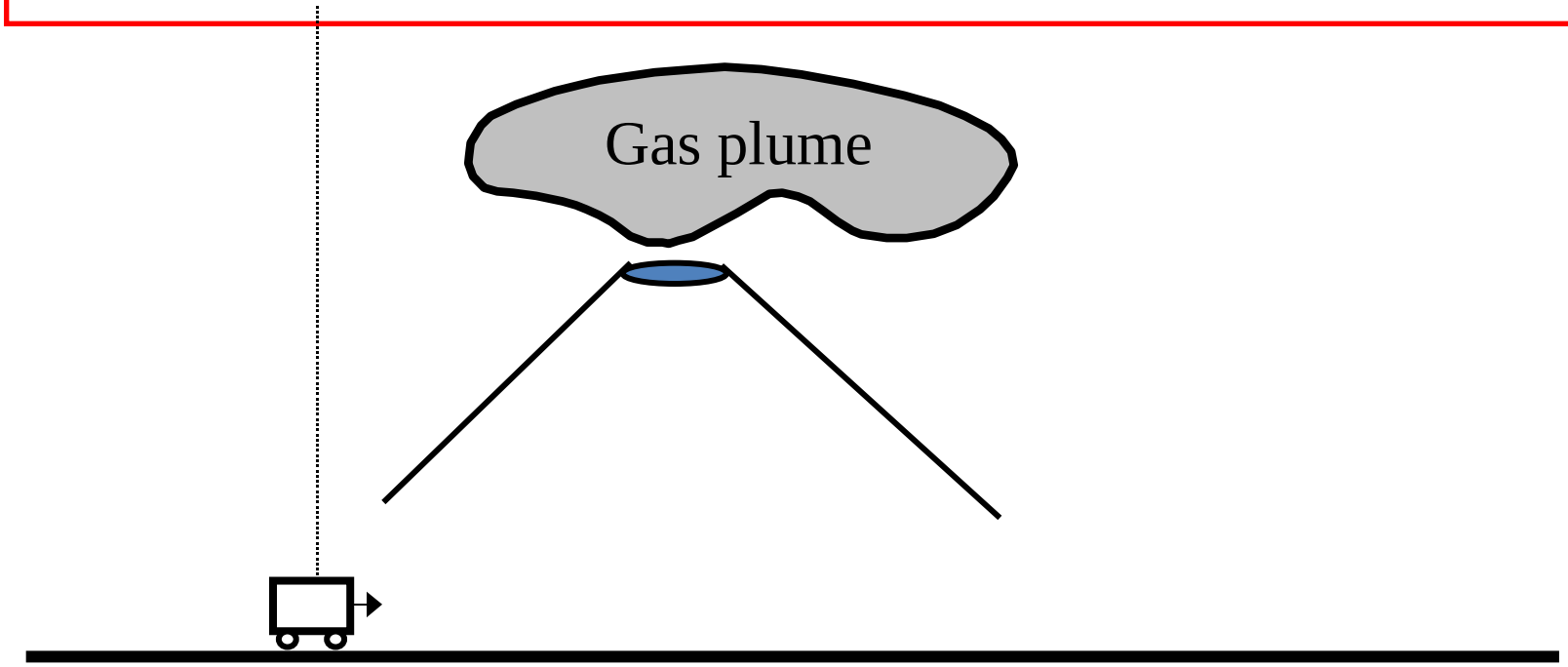
The Mini-DOAS instrument



Typical mini-DOAS SO_2 spectrum



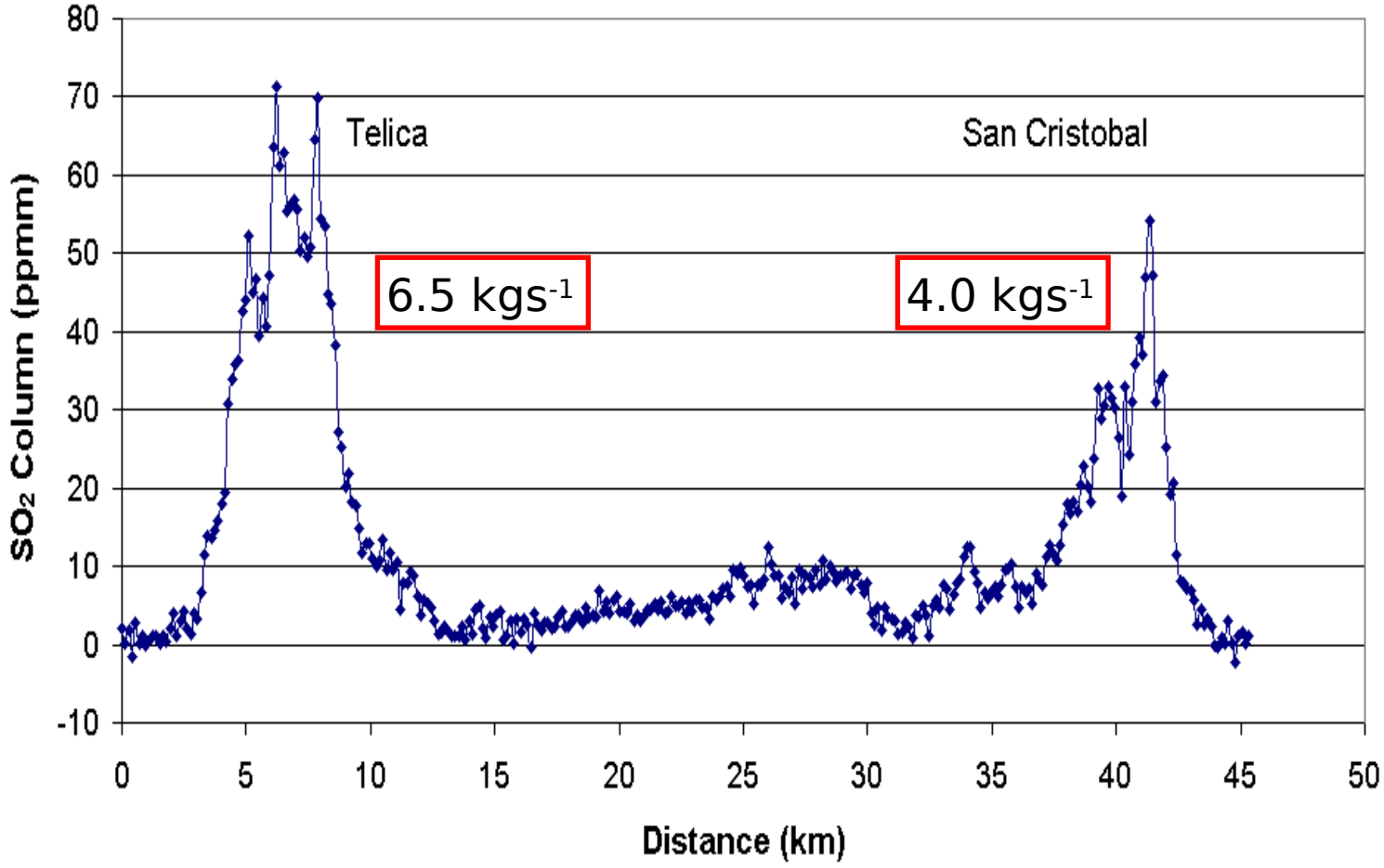
Mobile mini-DOAS



SO_2 [mg/m²]

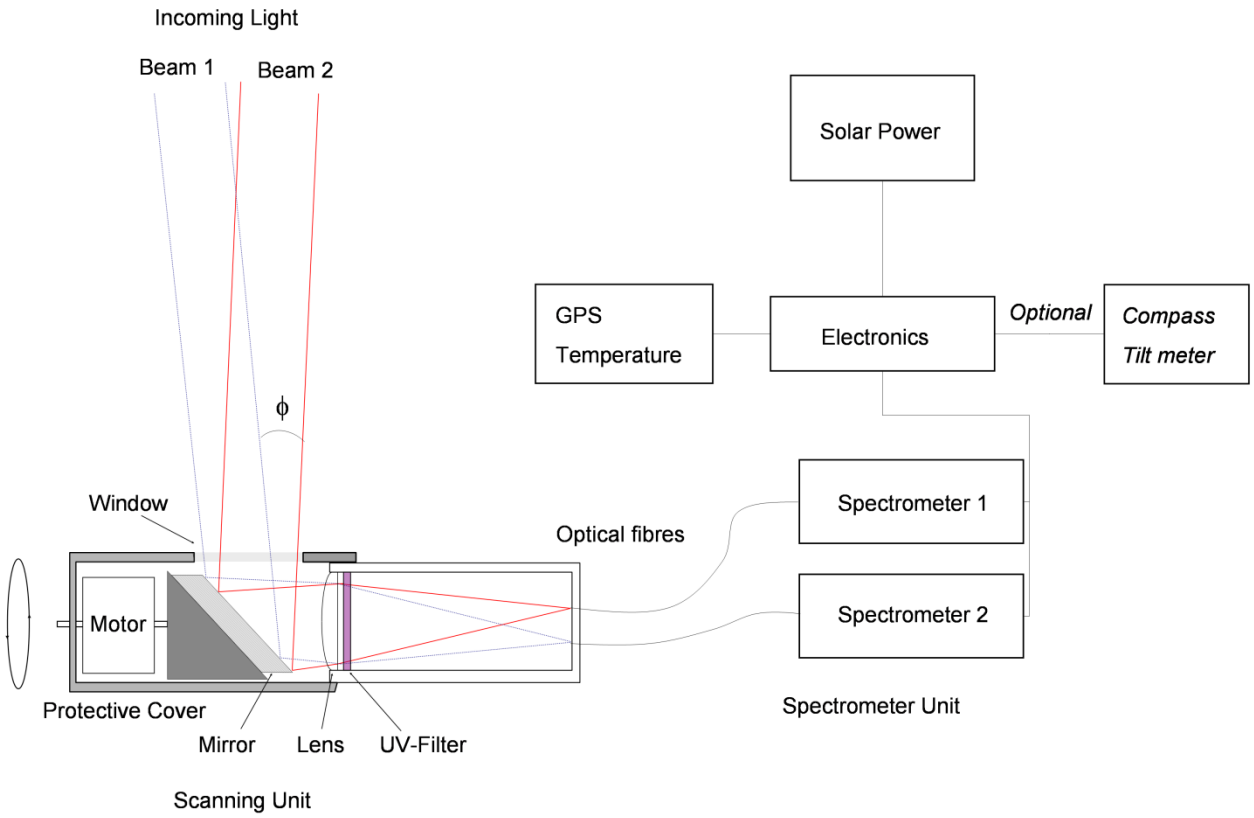
Distance Travelled [m]

Mobile flux measurements



Poas Volcano, Costa Rica 2002

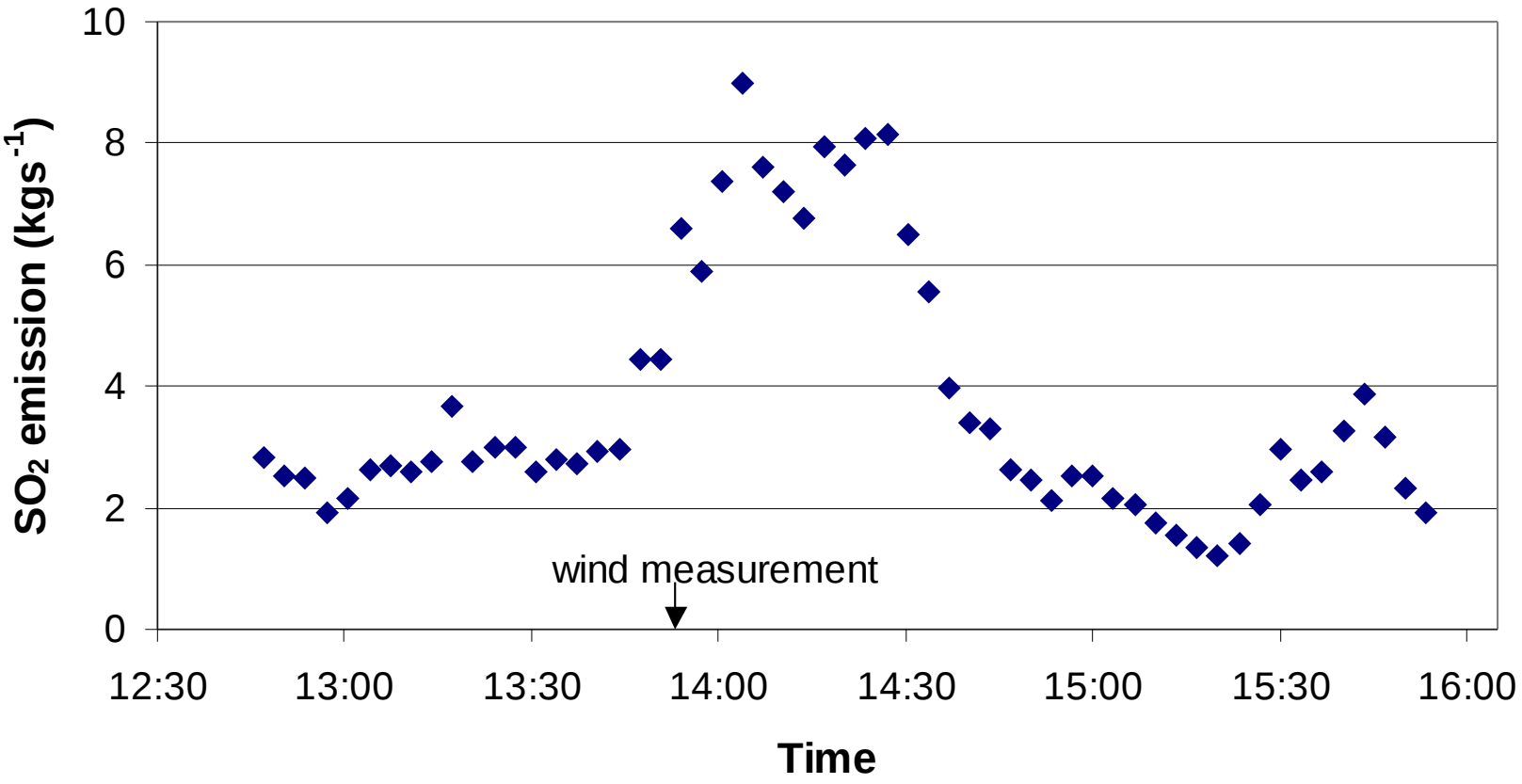
The Scanning Mini-DOAS instrument



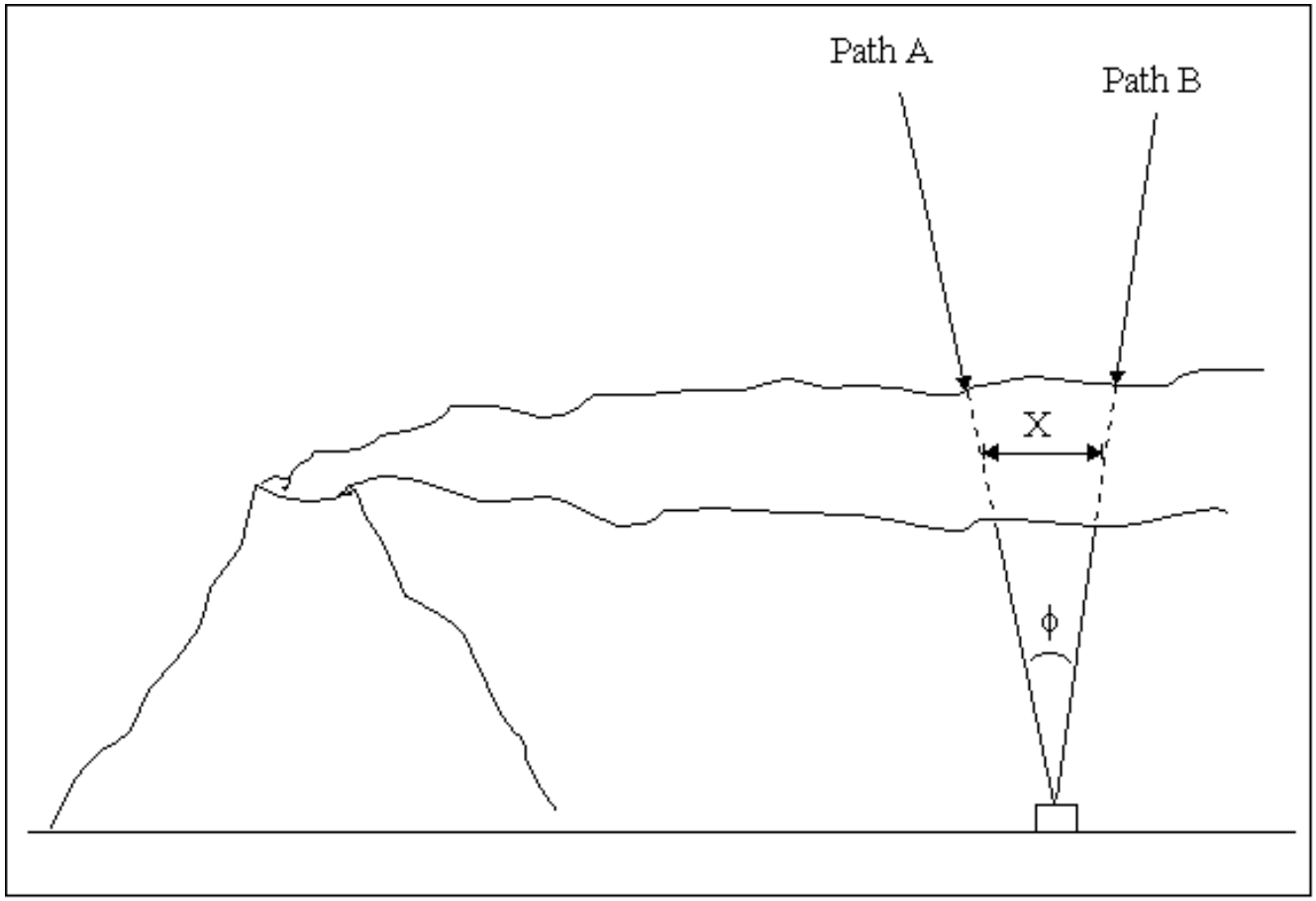
San Cristobal, Nicaragua, Nov. 2006

Scanning mini-DOAS measurement

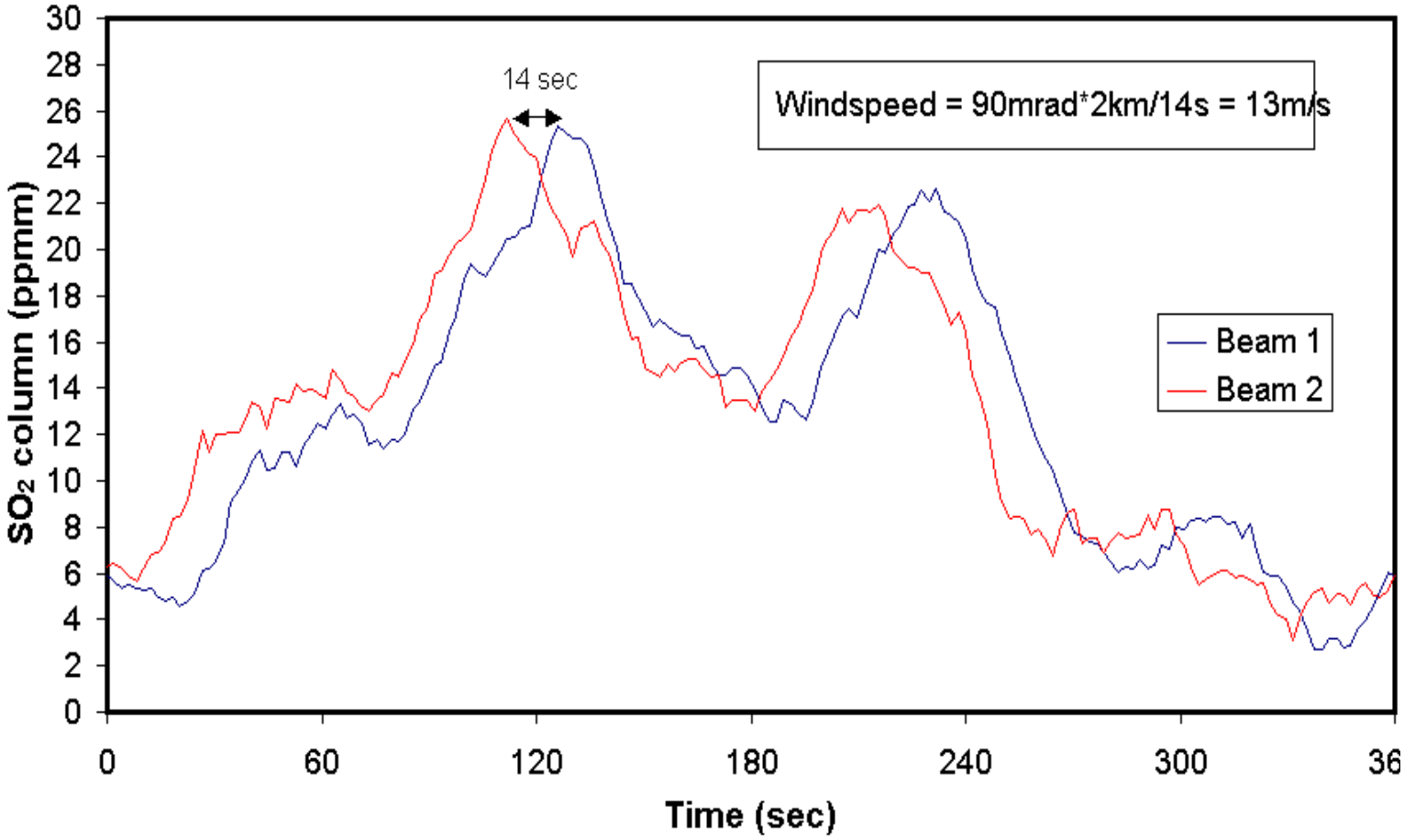
San Cristobal Volcano, Nicaragua



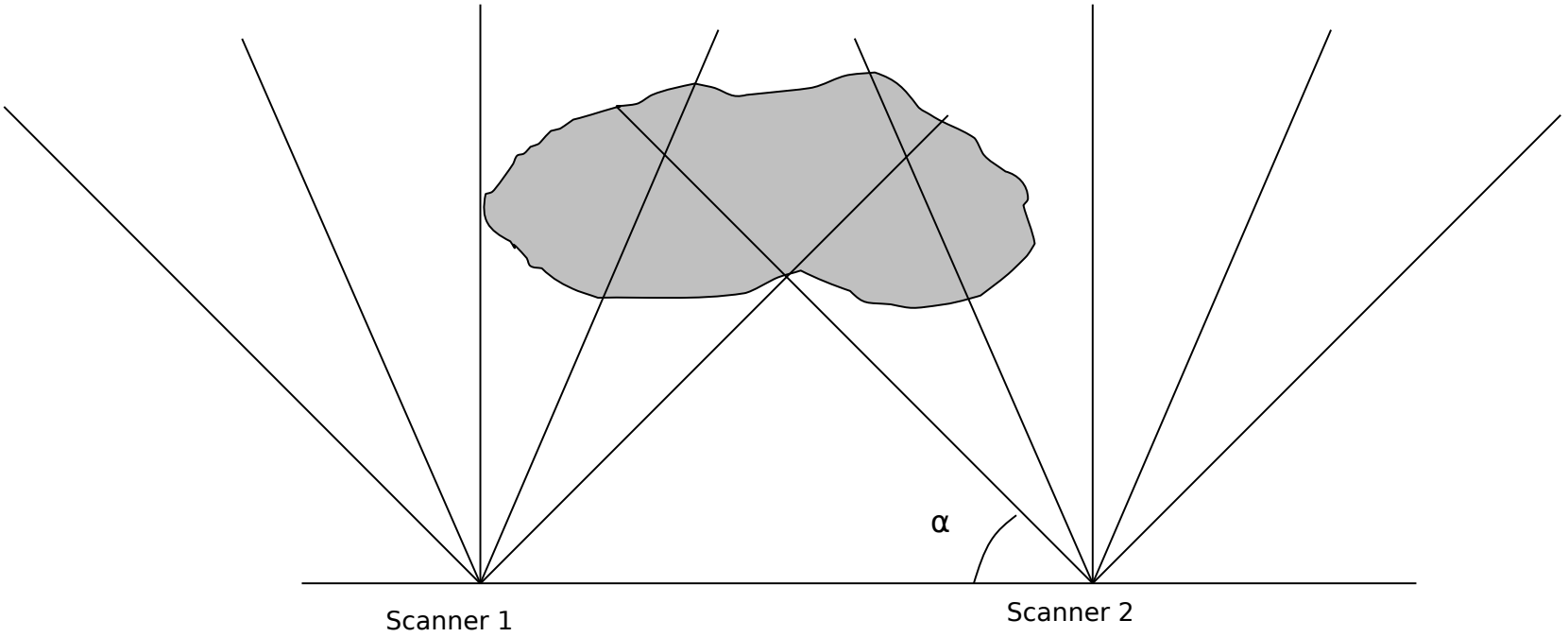
Measurement of plume speed using Dual-beam mini-DOAS



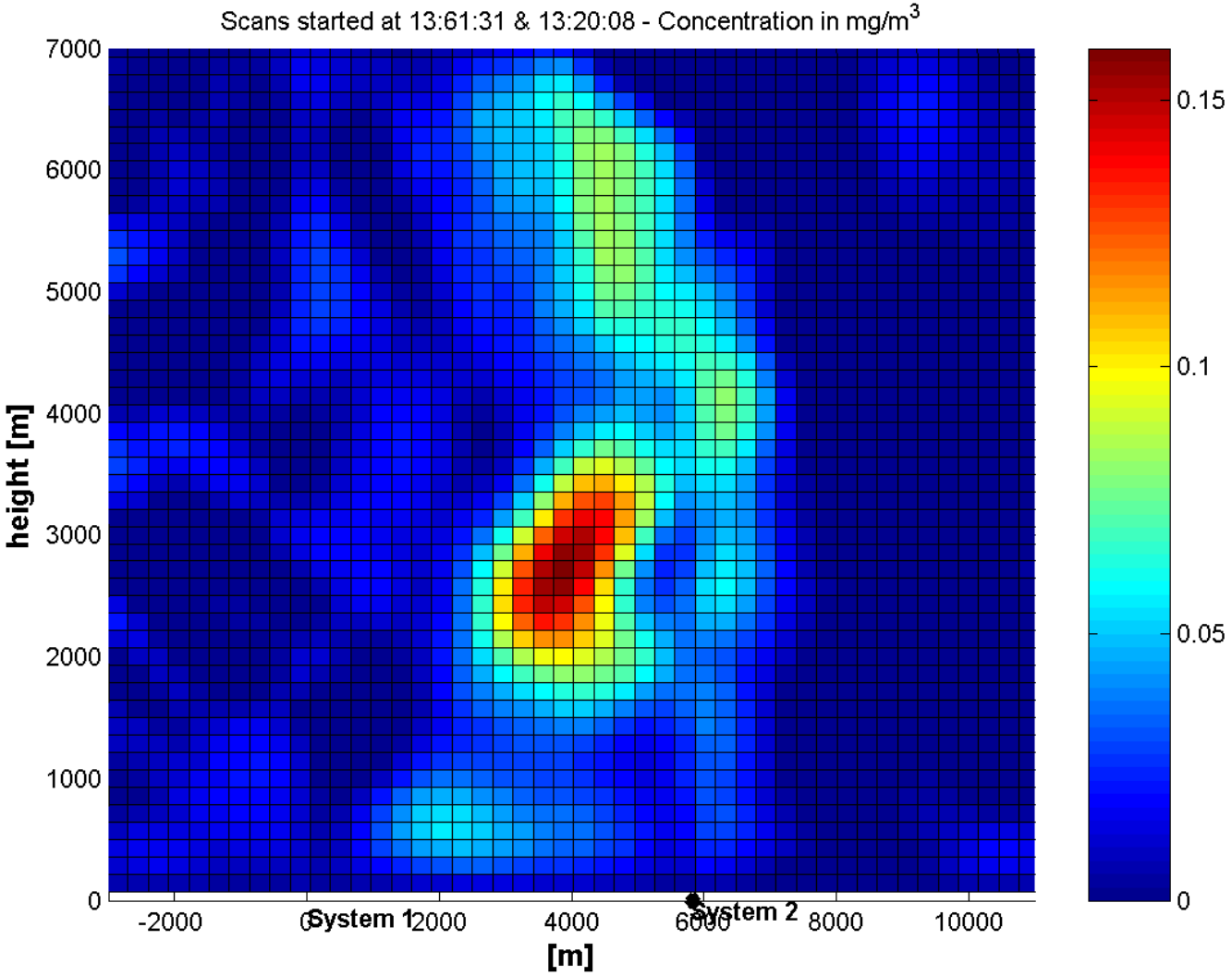
Wind speed measurement using Dual-beam mini-DOAS



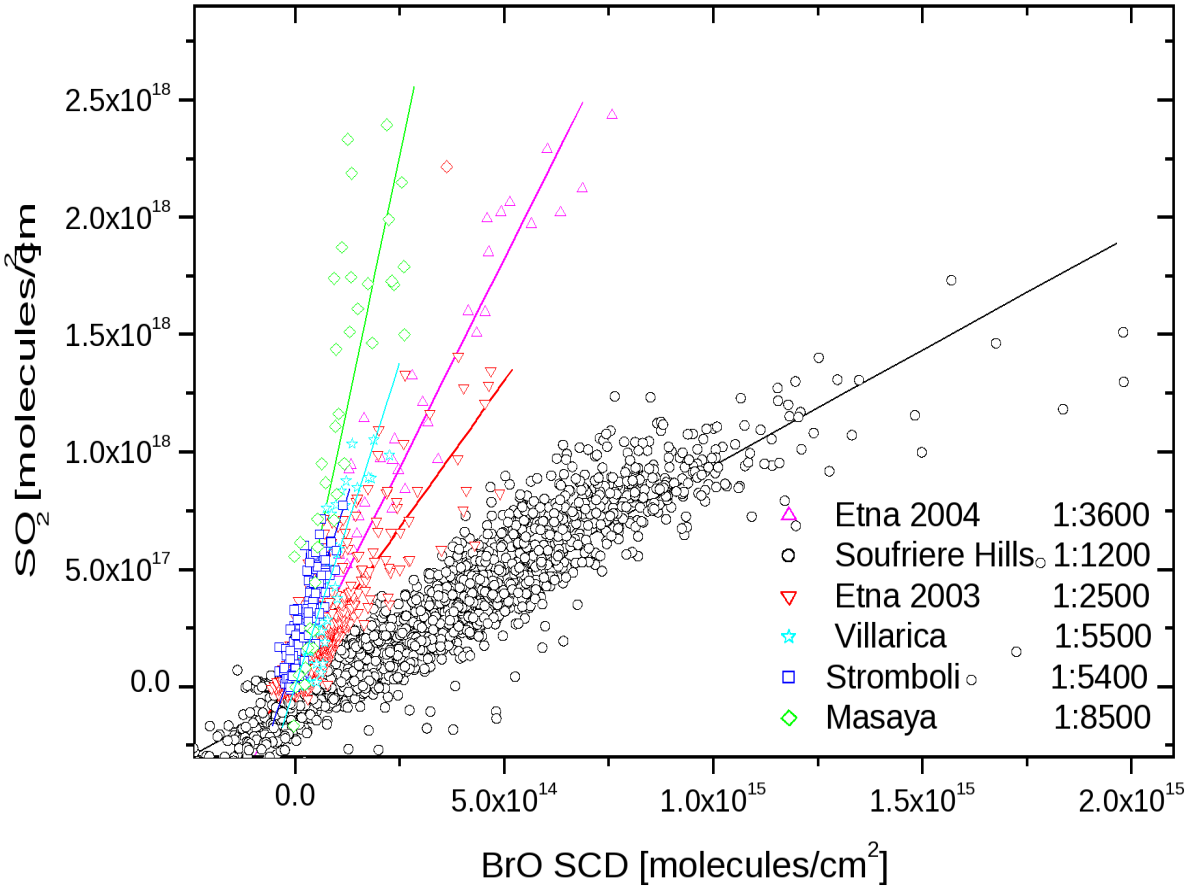
Measurement of plume height and dispersion using DOAS tomography



Tomographic scan of the plume from Etna 12 km downwind



Measurement of the BrO/SO_2 ratio in a volcanic gas plume



(Data; Nicole Bobrowski, INGV Palermo)

NOVAC
Network for Observation of Volcanic and Atmospheric Change

EU-project Oct 2005 – March 2010

Aim:

- To establish a network based on Dual-Beam Scanning mini-DOAS instruments on volcanoes.
- To use the data for local geophysical research and risk assessment
- To improve global gas assessments, validate satellites and study correlation of gas emission in time and space
- In addition spectra will be used for atmospheric change research

Project Partners

nstrument, Networking and global data exploitation

Chalmers University	B. Galle
Heidelberg University	U. Platt
Institut Aerospatiale de Belgique (IASB), Belgium	M. Van Roozendael
Cambridge University, UK	C. Oppenheimer
IFM-GEOMAR, Kiel, Germany	T. Hansteen
Massachusetts Institute of Technology, USA	M. & L. Molina
University of Maryland, USA	S. Carn

Volcano Observatories

INGV-CT, Italy	M. Burton	Etna
IPGP, France	G. Boudon	Reunion, Guadeloupe
INETER, Nicaragua	A. Muños	San Cristobal, Masaya
OVSICORI, Costa Rica	E. Duarte	Arenal, Turrialba
INGEOMINAS, Colombia	G. Garzon	Galeras, Nevado del Ruiz, N. de Huila
SNET, El Salvador	D. Escobar	San Miguel, Santa Ana
OVG, D.R. Congo	M. Kasereka	Nyiaragongo, Nyamulagira
UNAM, Mexico	H. Delgado	Popocatepetl, Colima
IGEPN, Ecuador	S. Hidalgo	Tungurahua, Cotopaxi
INSIVUMEH, Guatemala	E. Sanchez	Fuego, Santiaguito
INGV-PA, Italy	S. Inguaggiato	Vulcano
OVDAS, Chile	T. Hansteen	Villarrica, Llama
USGS, Hawaii	J. Sutton	Kilahuea

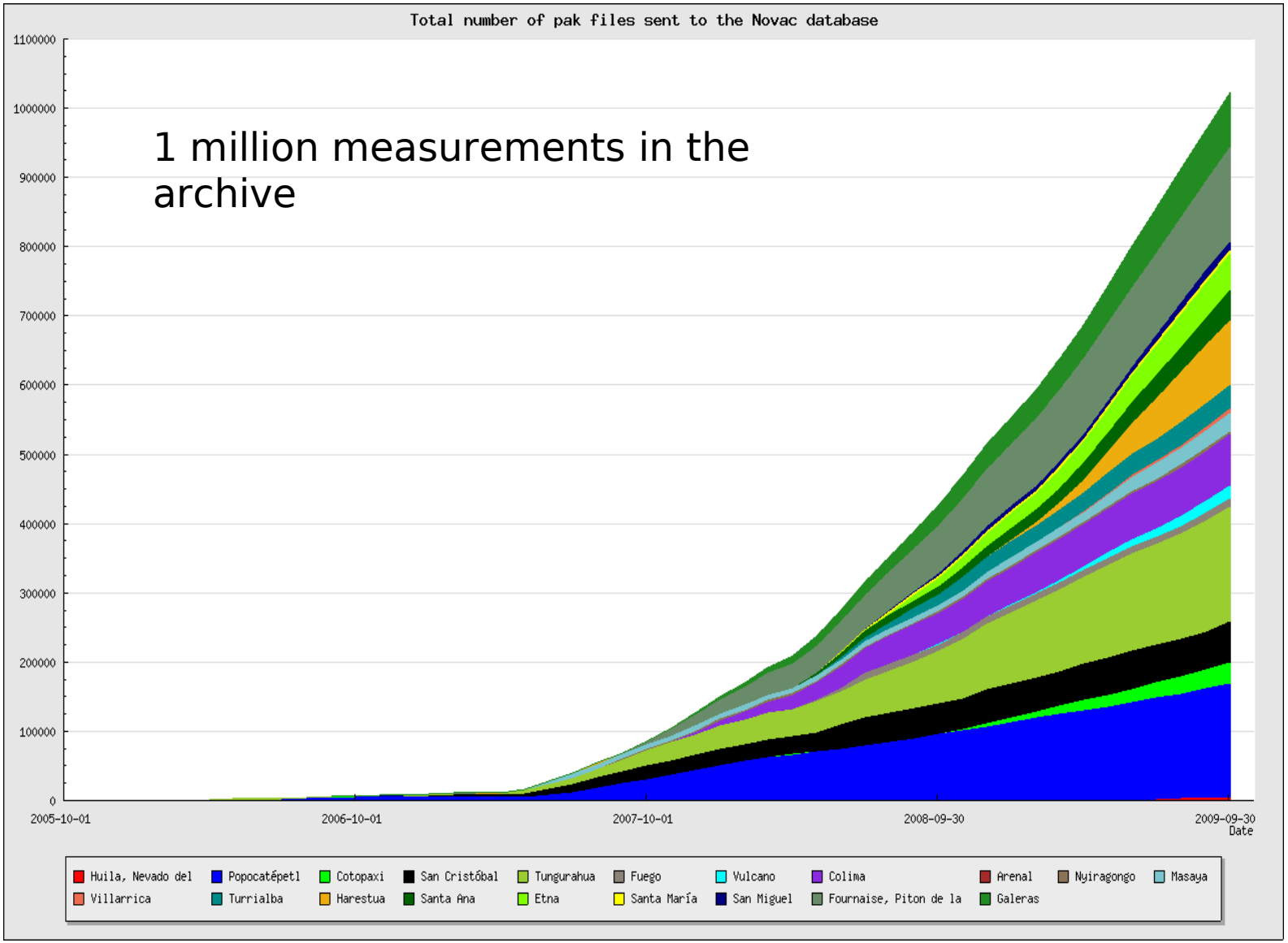
NOVAC Volcanoes

Installations completed January 2010

Volcano	Country	Installed	Date
San Cristobal	Nicaragua	3 instruments	Nov. 2006
Tungurahua	Ecuador	3+1 instruments	March 2007
Masaya	Nicaragua	2 instruments	April 2007
Popocatepetl	Mexico	3+1 instruments	May 2007
Nyiragongo	D. R. Congo	4 instruments	June 2007
Piton de Fournaise	Reunion Island	3+1 instruments	August 2007
Cotopaxi	Ecuador	1 instrument	Oct 2007
Galeras	Colombia	3 instruments	Nov 2007
Colima	Mexico	2 instruments	Dec 2007
Santa Ana	El Salvador	2 instruments	April 2008
San Miguel	El Salvador	2 instruments	April 2008
Fuego	Guatemala	2 instruments	April 2008
Santiaguito	Guatemala	2 instruments	April 2008
Turrialba	Costa Rica	4 instruments	April 2008
Volcano	Italy	1 instrument	May 2008
Etna	Italy	2+2 instruments	July 2008
Villarrica	Chile	2 instruments	March 2009
Nevado de Huila	Colombia	2 instruments	March 2009
Nevado de Ruiz	Colombia	2 instruments	Nov 2009
Llama	Chile	3 instruments	Jan 2009

53 instruments installed on 20 volcanoes,

The NOVAC Database

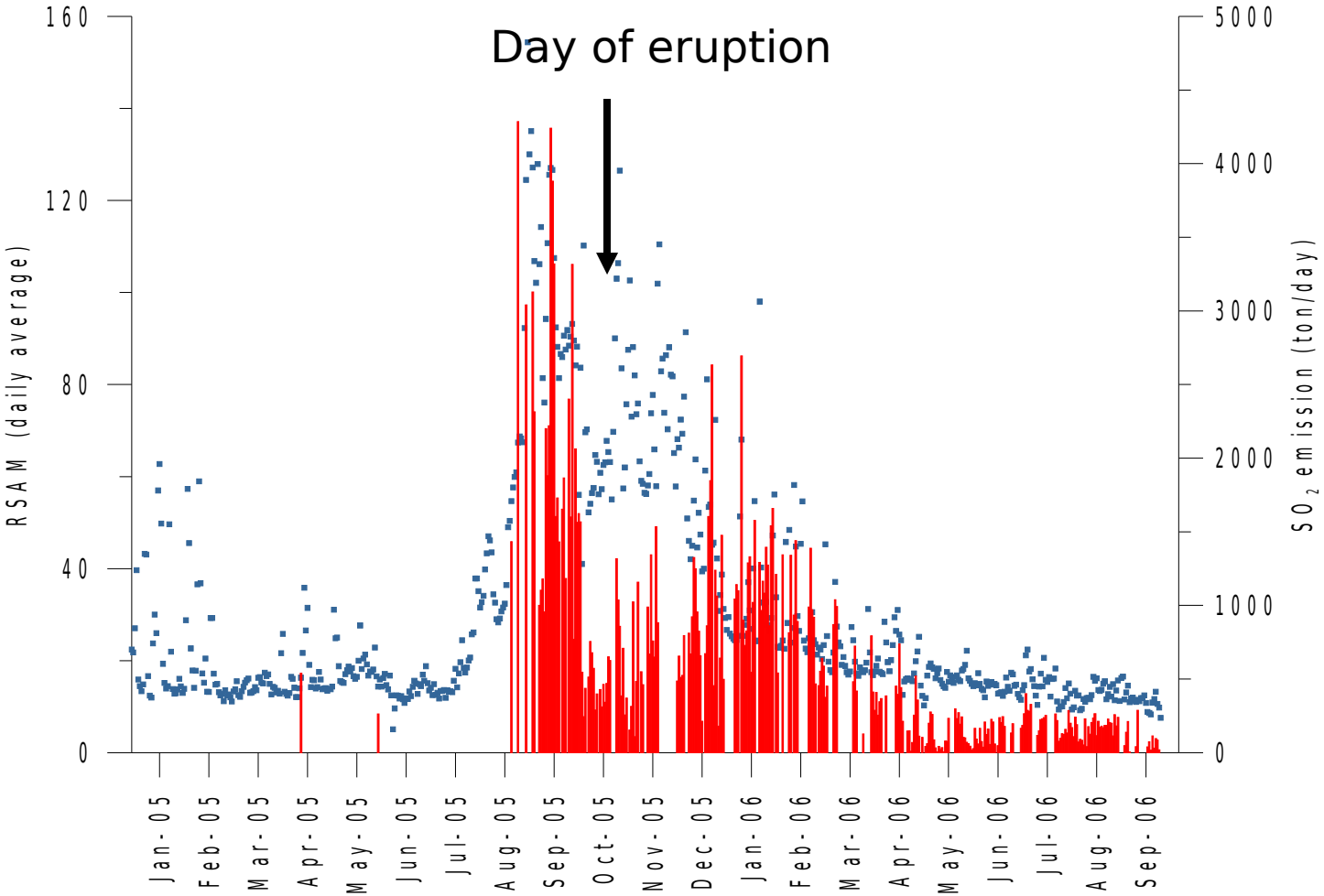


Santa Ana, El Salvador

Eruption
1 Oct. 2005

Photo Rodolfo Olmos, UES

SO_2 and RSAM, Daily averages Santa Ana, Jan 2005 – Sept 2006

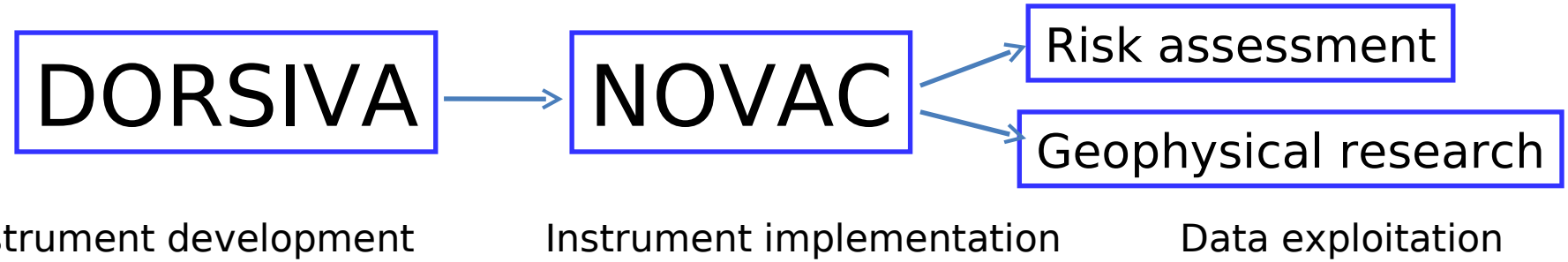


(Data; Servicio Nacional de Estudios Territoriales and University of El Salvado

Future

Networking	Research	Data exploitation
Support existing network	Volcanology	Volcano risk assessment
Maintain archive	Atmospheric chemistry	Climate change modelling
Supply instruments	Environmental impact	Satellite validation
Provide platform	Instrument development	Volcanic ash advisory

Future



Networking	Research	Data exploitation
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