

# Implementation of Long-term Greenhouse Gas Observation Capacities in Chile and Vietnam



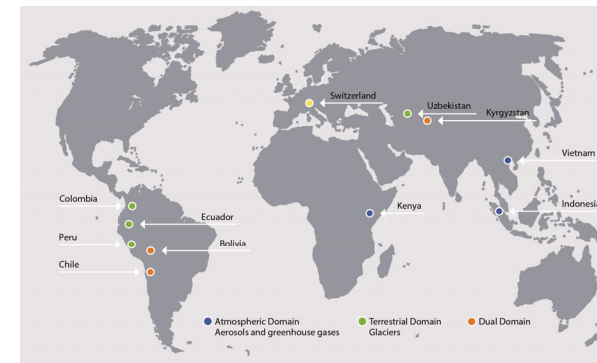
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## Introduction – the CATCOS project

Under the Global Atmosphere Watch programme, more than 400 atmospheric monitoring stations worldwide contribute to long-term observations of the chemical composition of the atmosphere. However, data sparse regions still exist in large areas of the world.

To fill this gap, the project Capacity Building and Twinning for Climate Observing Systems (CATCOS) aims at establishing and resuming systematic

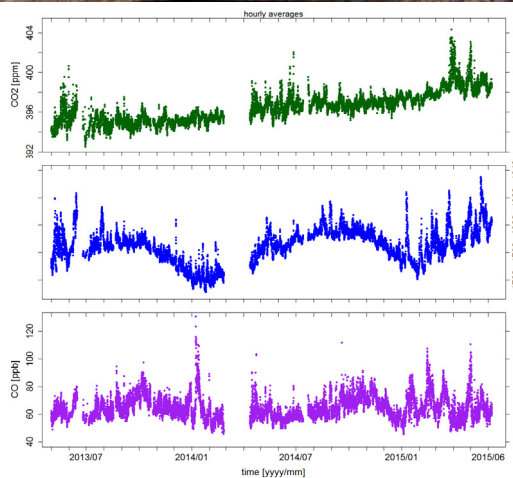
observations of atmospheric and terrestrial Essential Climate Variables in developing and emerging countries where the density of observations is currently insufficient (see map on the right). Empa is in charge of establishing and developing sustainable and high-quality greenhouse and reactive gas (carbon dioxide, methane, carbon monoxide and ozone) measurement capabilities in Chile and Vietnam.



Countries of intervention within the CATCOS project.

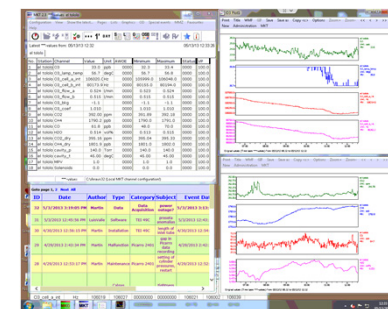
### El Tololo, Chile

30.17 degS, 70.80 degW, 2220 m asl



CO<sub>2</sub>, CH<sub>4</sub> and CO at El Tololo from May 2013 till June 2015.

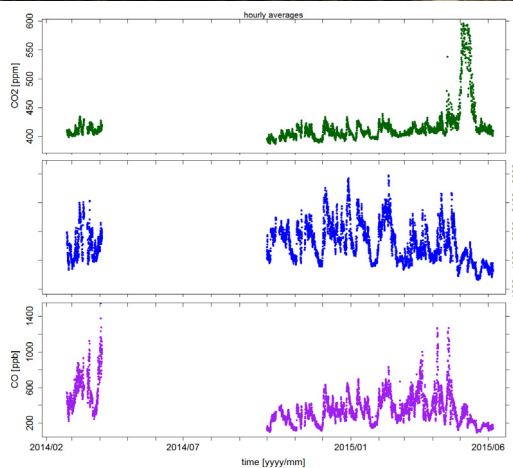
- the El Tololo station allows sampling of pristine air masses representative for Southern Hemisphere background conditions
- due to its location west of the main Andes mountain ridge, an influence from the South American continent is rare
- the CO<sub>2</sub> record shows no seasonal cycle and thus no biospheric signal
- CH<sub>4</sub> reveals a distinct seasonal cycle driven by the CH<sub>4</sub> removal through reaction with the OH radical
- low CO mole fractions corroborate the unpolluted Southern Hemispheric conditions at El Tololo



On-site data acquisition and electronic logbook.

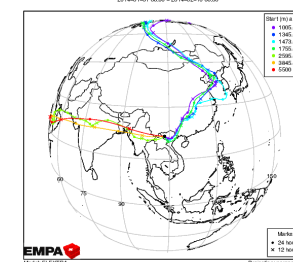
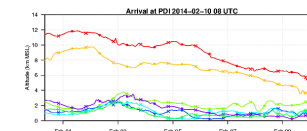
### Pha Din, Viet Nam

21.57 degN, 103.52 degE, 1466 m asl



CO<sub>2</sub>, CH<sub>4</sub> and CO at Pha Din from March 2014 till June 2015.

- the Pha Din station is the first of its kind recording greenhouse gases, surface ozone and aerosol properties in a rural setting in Viet Nam
- a lightning strike in April 2014 caused severe damage that required major repair and led to a 6-month data gap
- observations provide important information on the impact of large scale biomass burning and the developing economy in the eastern Asian region on air quality
- the large variability in observed mole fractions reflects the different conditions the station is exposed to
- meteorological models will help to identify major source regions and to quantify emissions



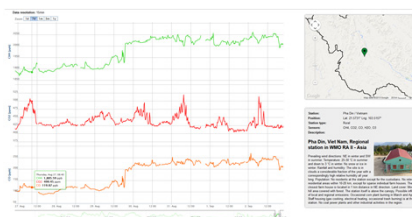
[http://lagrange.empa.ch/FLEXTRA\\_browser/](http://lagrange.empa.ch/FLEXTRA_browser/)

## Training & Capacity Building

- ongoing capacity building through on-site and long-term training, remote assistance and participation in workshops is key to ensure sustainable development and to maintain long-term observations with high-precision
- continuous collaboration also focuses on quality control as well as scientific analysis and interpretation of the data

## Data access

- last years' data are available at the World Data Centre for Greenhouse Gases
- near real-time data are accessible at <http://carbocount.empa.ch/StationsOverview.aspx?dataset=catcos>



## Conclusions & Outlook

- continuous greenhouse gas observation capacities were set up in Chile and Viet Nam in February 2013 and April 2014, respectively
- preliminary data analysis reveals the high potential of the observations
- within CATCOS Phase 2, Empa extends its efforts to establishing sustainable greenhouse gas observations in Kyrgyzstan

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