

# Establishment of Continuous Greenhouse Gas Observation Capacity in Northern Vietnam through a Swiss-Vietnamese collaboration

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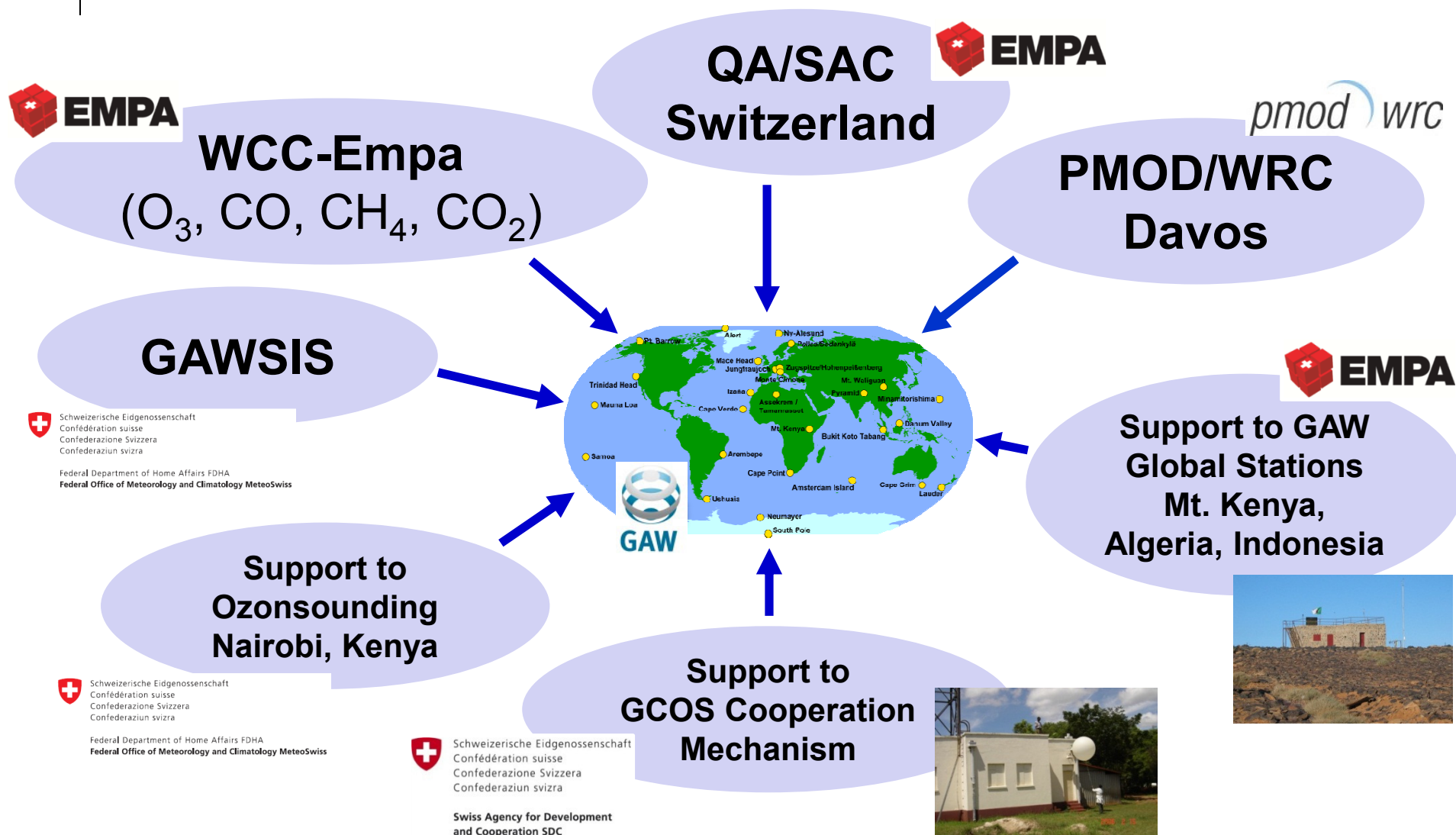
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<sup>3</sup> Empa, Laboratory for Air Pollution / Environmental Technology, Duebendorf, Switzerland

5th Asia-Pacific GAW Workshop on Greenhouse Gases, Jeju Island  
24 – 25 October 2013



# Swiss International GAW Activities





# GAW-CH – International Partnerships



	Station	Partner
1	Assekrem, Algeria 2710 m asl	Office National de la Météorologie
2	Bukit Koto Tabang, Indonesia 864 m asl	Indonesian Meteorological Climatological and Geophysical Agency
3	Mt. Kenya, Kenya 3678 m asl	Kenya Meteorological Department
4	Nairobi, Kenya ozone soundings	Kenya Meteorological Department





- Donor: **Swiss Agency for Development and Cooperation (SDC, Global Programme Climate Change)** Swiss Fast-Track Financing
- **Objective:** Improvement of Climate Observing Systems in Developing and Emerging Countries
- **Coordination:** MeteoSwiss  
Implementation Partners: PSI, Empa, Univ Zurich, Univ Fribourg
- **Duration:** Sep 2011 – Mar 2014; **Budget:** 2.3 Mio CHF (~ 2.5 Mio US\$)



# CATCOS – Projects Goals

- **Atmospheric Domain (AD)**  
Increase public availability and quality of observations of **aerosols and greenhouse gases**
- **Terrestrial Domain (TD)**  
Increase public availability and quality of **glacier monitoring** data
- **Cross-Cutting (CC)**  
**Increase the capacity** in each of these countries to produce, manage and analyze climate and environmental data







Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Federal Department of Home Affairs FDHA  
**Federal Office of Meteorology and Climatology MeteoSwiss**



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Swiss Agency for Development  
and Cooperation SDC



**EMPA**

PAUL SCHERRER INSTITUT



**Atmospheric Domain**



**Universität  
Zürich<sup>UZH</sup>**

UNIVERSITAS  
FRIBURGENSIS  
UNIVERSITÉ DE FRIBOURG SUISSE  
UNIVERSITÄT FREIBURG SCHWEIZ

**Terrestrial Domain**

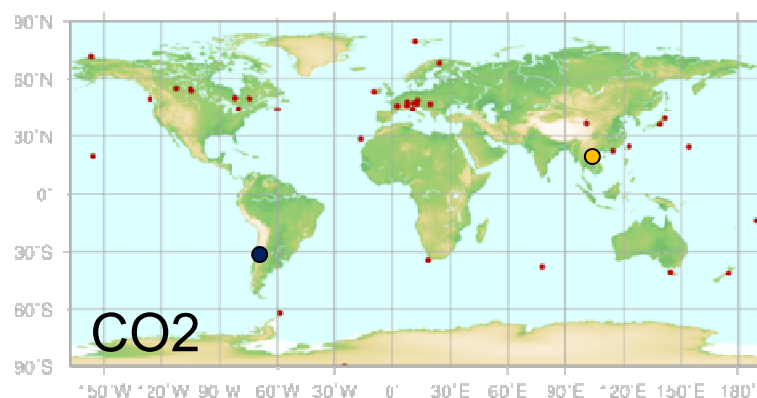


# CATCOS – filling global gaps

**CATCOS**  
Capacity Building and Twinning for Climate Observing Systems

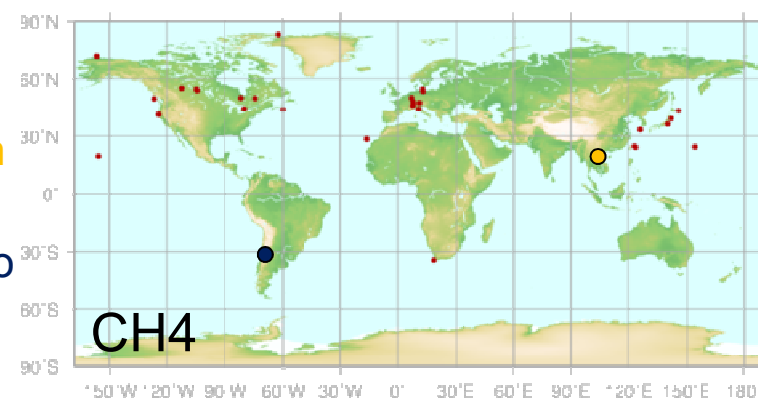


maps of available data in the World Data Center for Greenhouse Gases



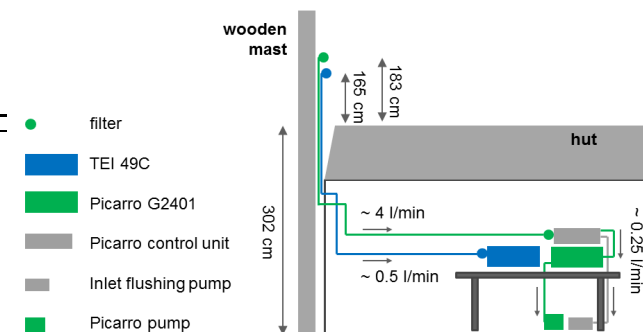
Pha Din

El Tololo





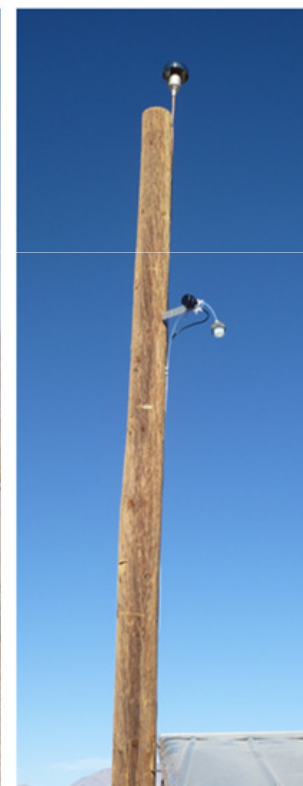
# Installation at El Tololo, Chile



measurement station



inlet





# Installation at El Tololo, Chile

installed equipment, greenhouse gases



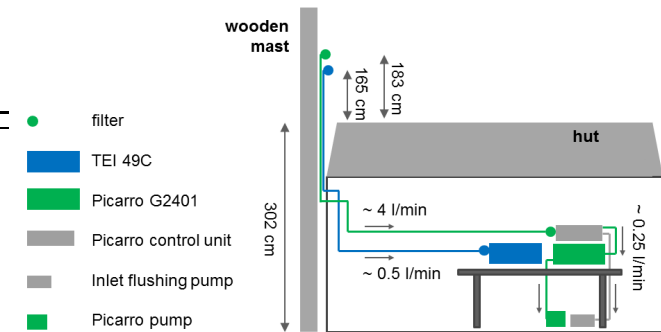
screenshot of data acquisition & logbook





# Installation planned at Pha Din

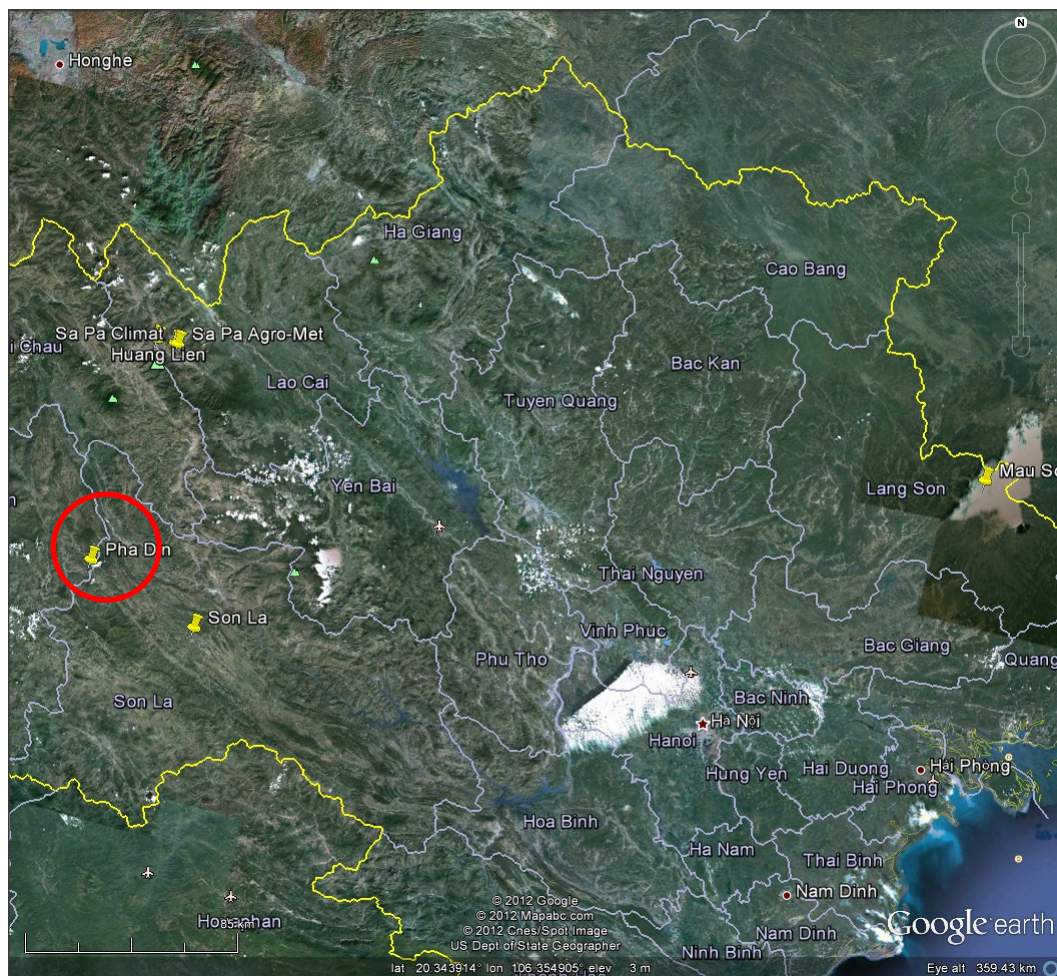
installed equipment, greenhouse gases



- laser Spectrometer for measuring carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), carbon monoxide (CO) (1)
- calibration unit for spectrometer (2)
- UV absorption analyzer for measuring ozone (O<sub>3</sub>) (3)
- computer with data acquisition software (4)
- six cylinders with calibration gases, three from CCL, three with assigned numbers from WCC-Empa (5)
- two pumps (6)



# Map Pha Din



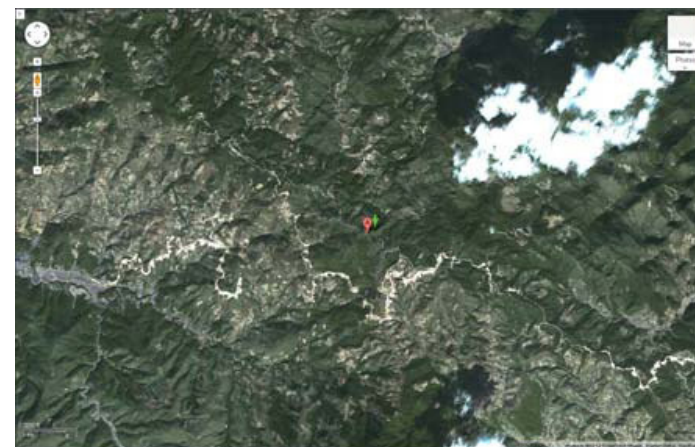
## Pha Din

Climatic and (future)

Radar station

21°57 degN, 103.31 degE

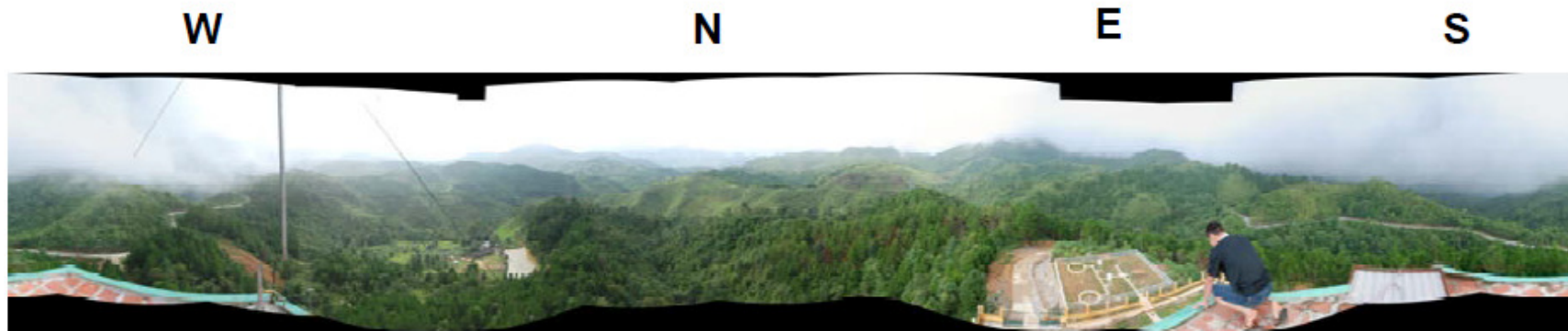
1,466 m asl





# Photos Pha Din - panorama

**Panorama Radar Tower**



**Panorama Station Level**





# Photos Pha Din - infrastructure



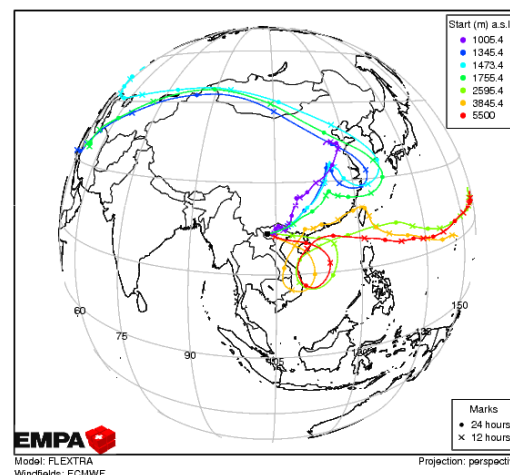
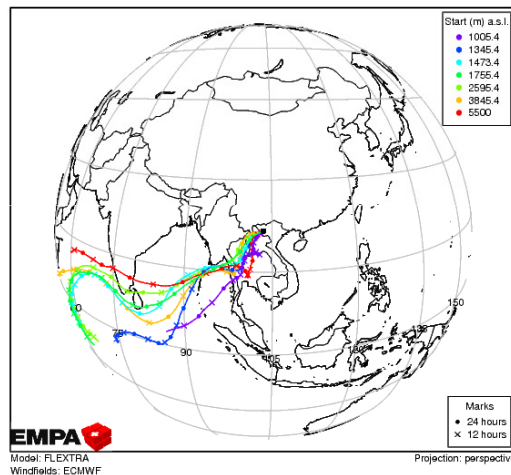
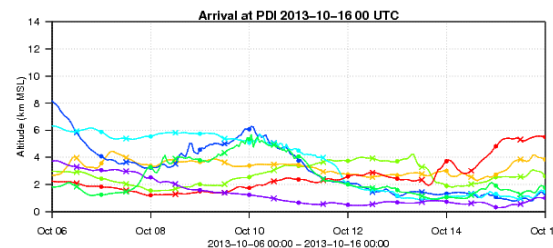
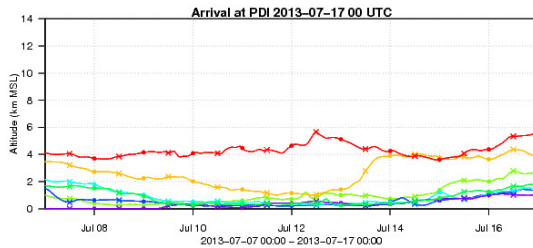
planned sample mast



lab space



# Backward trajectories for Pha Din



Empa operationally  
calculates 10-days backward  
trajectories  
6 times a day for Pha Din

Very useful for data  
interpretation

Analysis of the trajectories  
shows interesting patterns of  
different air mass origins

Trajectories are freely available at  
[http://lagrange.empa.ch/FLEXTRA\\_browser/](http://lagrange.empa.ch/FLEXTRA_browser/)



# Progress of preparatory work in Viet Nam

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January 2013 – Approval of the CATCOS project documentation at NMHS

June 2013 – Conclusion of a Memorandum of Understanding between MeteoSwiss and NHMS

September 2013 – Approval of a supplemental Vietnamese proposal for additional counterpart funding by the Ministry of Natural Resources and Environment (MONRE)

Counterpart funding will be used for investments into infrastructure (construction and installation of electrical lines, internet and other ancillary works) and for local manpower. Funding will also secure the operation after the end of the CATCOS project.

Final approval by NHMS' project management unit is still pending



## Next steps / future schedule

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after final approval by the project management unit (very soon)  
upgrade of the existing infrastructure will be made

implementation of the measurement equipment is planned for  
early 2014

progress is currently on hold due to the pending PMU's final  
approval



# Conclusions

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- the greenhouse gas observation capacity was successfully implemented at El Tololo (Chile) in April this year
- the operation at El Tololo proofed the capability of the selected equipment to be operated continuously at a remote location and produces high-quality data
- implementation of the project at the CATCOS station in Viet Nam is slightly behind schedule due to delayed diplomatic and administrative progress
- once the equipment at Pha Din is installed and runs operationally, the new time series will provide very interesting data in a rural environment in Northern Viet Nam in particular and useful information on the long-term evolution of the atmospheric greenhouse gas burdens in the background atmosphere in the Northern part of South-East Asia in general

## **Thank you for your attention!**