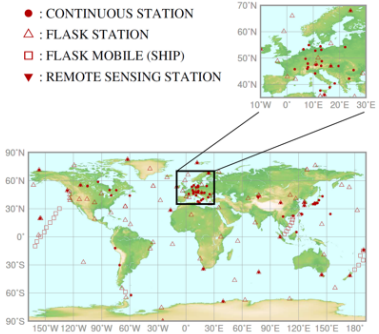
International collaboration in supporting observations in data sparse regions – lessons learnt from the Quality Assurance / Science Activity Centre Switzerland

global availability of atmospheric composition observations is non-uniform

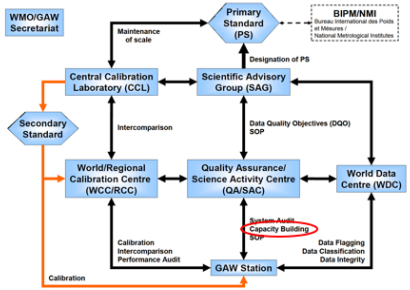


stations reporting CO_2 data to WDCGG [1]

data sparse regions particularly exist in developing countries

[1] WMO WDCGG Data Summary #44, 2020.

capacity development is a strategic priority of GAW



schematic of the GAW QA system [2]

capacity building is also an essential part of GAW's quality assurance system

[2] WMO Global Atmosphere Watch (GAW) Implementation Plan: 2016-2023, GAW Report No. 228, 2017.

training, twinning & capacity building is a central task of QA/SAC Switzerland

experience shows that twinning is a lengthy process

A-priori: basic equipment / infrastructure available, willingness to perform high-precision air quality observations in a pristine environment

- advice for instrument selection
- technical support / advice to set up measurement capabilities
- regular on-site training
- remote support / trouble shooting
- facilitating the provision of spare parts
- support for data processing / data submission
- support for (research) proposal writing
- support for scientific data analysis and publication

> 10 years

A-posteriori: fully autonomous monitoring station, high-quality data, good visibility in the GAW and the scientific community

some obstacles for a sustainable twinning success are

- lack of consumables
- lack of spare parts
- lack of budget, lack of financial authority
- hierarchy issues within the organisation
- (long-term) commitment of the partner
- insufficient know-how
- distance to the headquarters
- unclear responsibilities within an institution and among the partners
- fluctuation in staff
- language barriers
- ...

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International collaboration in supporting observations in data sparse regions

lessons learnt from the Quality Assurance / Science Activity Centre Switzerland

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Global Atmosphere Watch
QA / SAC Switzerland

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Background

- Long-term continuous measurements of air pollutants and greenhouse gases are essential to understand and quantify the variability and trends of atmosphere's chemical composition.
- To gather information for the whole globe, a good spatial resolution of consistent, high-quality compatible data is an indispensable prerequisite.
- Substantial national and international efforts have led to a considerable increase in measurement stations for atmospheric composition observations and to a substantial improvement in spatial coverage worldwide.
- However, persistent quality and sustainability of initial investments is often suffering from limited local expertise and insufficient budget for the long-term operation and maintenance of the instrumentation.

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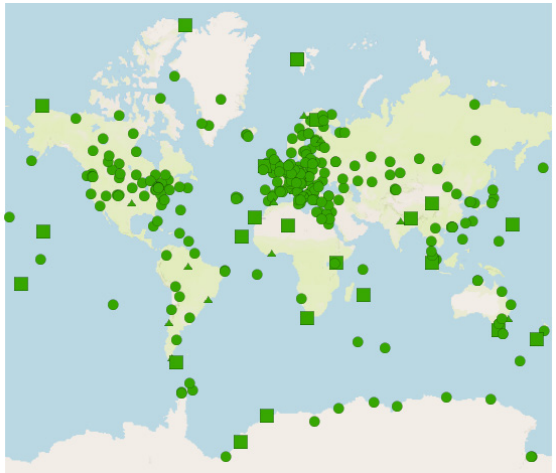
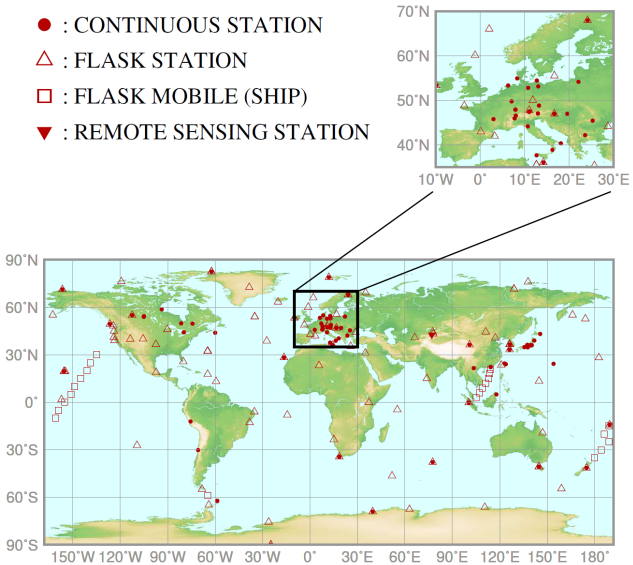
Background, cont'd

In practice,

- global availability of atmospheric composition observations is non-uniform, and
- data sparse regions particularly exist in developing countries.



operational global, regional, and local GAW stations and stations from contributing networks as listed in GAWSIS (https://gawsis.meteoswiss.ch).



stations reporting CO2 data to the World Data Center for Greenhouse Gases (WMO WDCGG Data Summary #44, 2020).

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Twinning as part of GAW's Capacity Development

- Capacity development is one of the strategic priorities within the GAW programme, and the GAW Implementation Plan identifies so-called twinning initiatives as an important tool to improve the sustainability and data quality of existing and to-be-established GAW observations.
- Twinning programmes are typically bilateral international collaborations between less-experienced GAW stations and experienced GAW stations or specialized Central Facilities.
- Twinning collaborations can involve different facets of activities ranging from remote support to joint on-site implementation and operation.

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Quality Assurance / Science Activity Centre Switzerland

- The Quality Assurance / Science Activity Centre Switzerland (QA/SAC-CH) was established in the year 2000.
- Initially, twinning was mainly devoted to six GAW stations in Algeria, Argentina, Brazil, China, Indonesia and Kenya, which were established in the mid-1990ies under the Global Environment Facility (GEF) programme.
- Over time, due to the growing expertise and awareness of QA/SAC-CH, developments of the GAW network, and improved technical means for remote support and trouble-shooting, the activity became more diverse and comprehensive.
- Additionally, dedicated programmes, such as CATCOS (Capacity Building and Twinning for Climate Observing Systems), allowed expanding the Swiss engagement through the establishment of new observations in Chile, Kyrgyzstan and Vietnam.

GAW
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Successful twinning needs to be versatile and long-term

From: basic equipment / infrastructure available, willingness to perform high-precision air quality observations in a pristine environment

- advice for instrument selection
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- support for scientific data analysis and publication

To: fully autonomous monitoring station, high-quality data, good visibility in the GAW and the scientific community

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Success is jeopardized by …

- lack of consumables
- lack of spare parts
- lack of budget, lack of financial authority
- hierarchy issues within the organisation
- (long-term) commitment of the partner
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