



National Systematic Observations of the Climate as part of a Global Effort

- GCOS Regional Workshops

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**GLOBAL CLIMATE
OBSERVING SYSTEM**

KEEPING WATCH OVER OUR CLIMATE



International
Science Council



GCOS/WIGOS Regional Workshops

Meeting Format

- Following SBSTA 45 request in 2016
- Held together with WMO Integrated Global Observing System (WIGOS) in association with UNFCCC
- Allow time for countries to present the issues and discussion
- Participants identify and agree locally relevant key issues
- Listen not lecture

Meeting Content

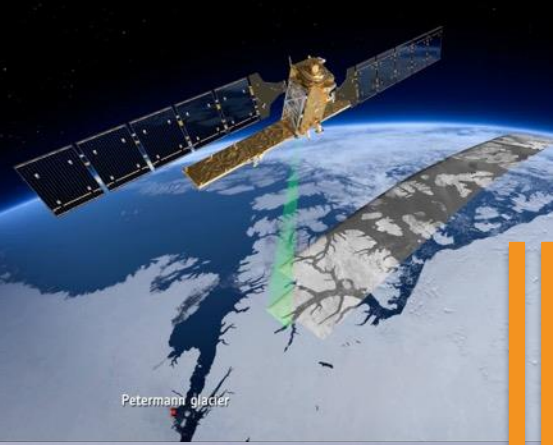
- Considered basic data needs for current climate models and reanalysis
 - Surface and Upper Air Meteorological Observations
- Asked why data was not available internationally
- Did not consider all Essential Climate Variables
- Only considered national contributions to global models

Only by sharing and exchanging data can its full value be realised by countries



Sharing and exchanging data leads to benefits in all countries – it is a global good

While there are many varied climate variables, national surface and upper air observations underpin climate modelling and planning



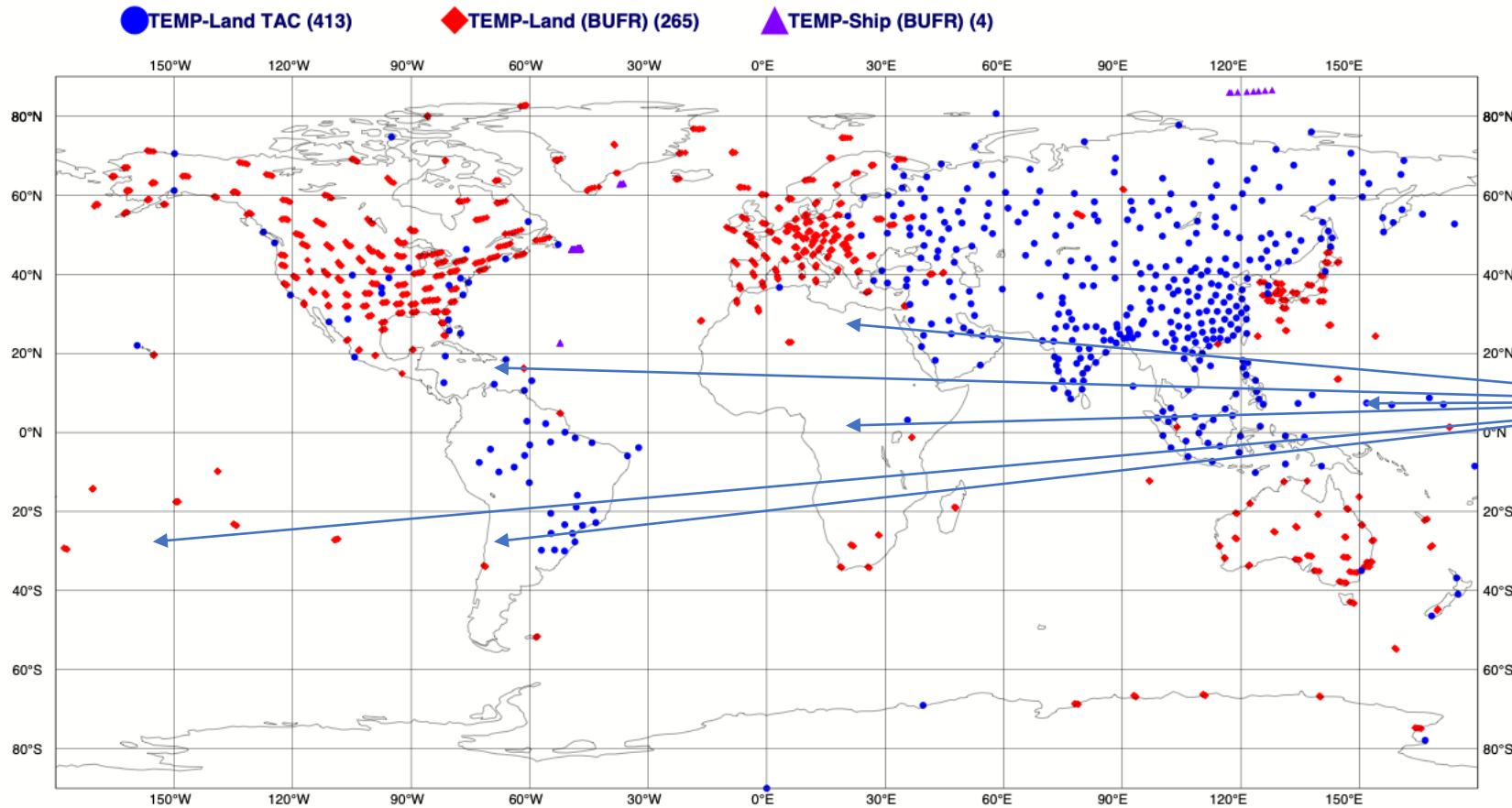
A wide range of national and regional networks, ocean observations and satellites, all contribute to the Global Climate Observing System



Supporting and maintaining these networks, and sharing the data they produce, is fundamental to ensuring systematic climate observations.

Global Models Need Local Data

Upper Air Data used by one global modelling centre (ECMWF) 12/11/2019 00UTC



Increased errors in
global forecasts and
projections



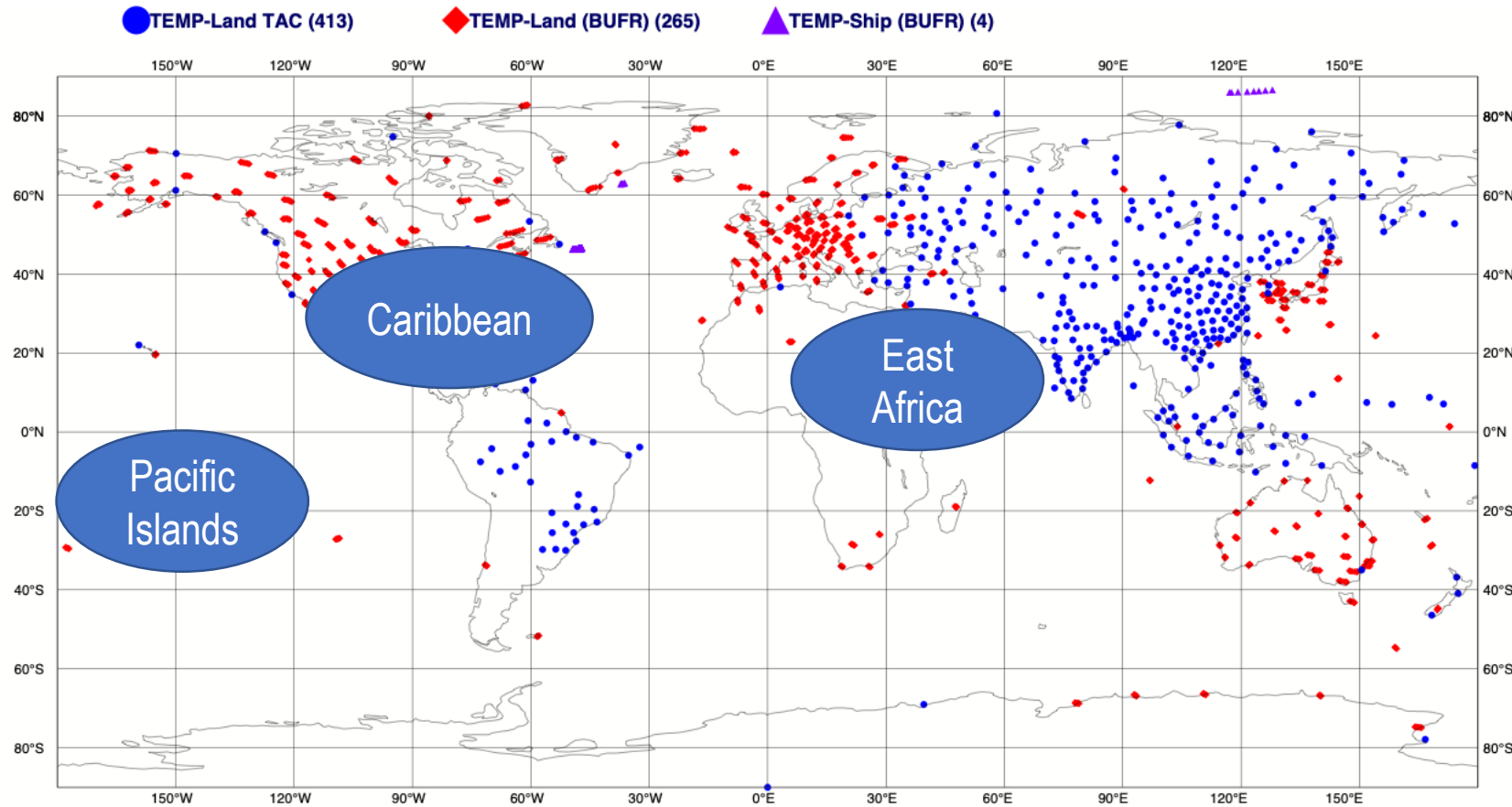
Significant Gaps
in some areas



Poor forecasts
and projections in
these areas

Global Models Need Local Data

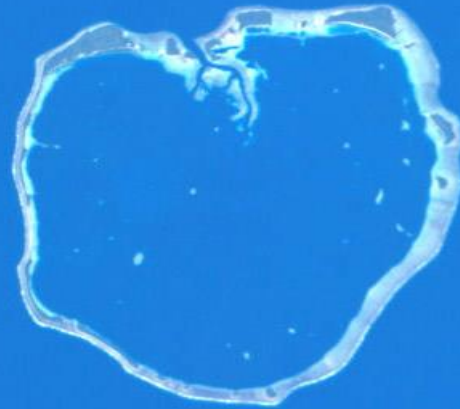
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**3 Regional Workshops
(so far!)**

South Pacific SIDS – October 2017

Existing project-based funding does not lead to sustainable observations

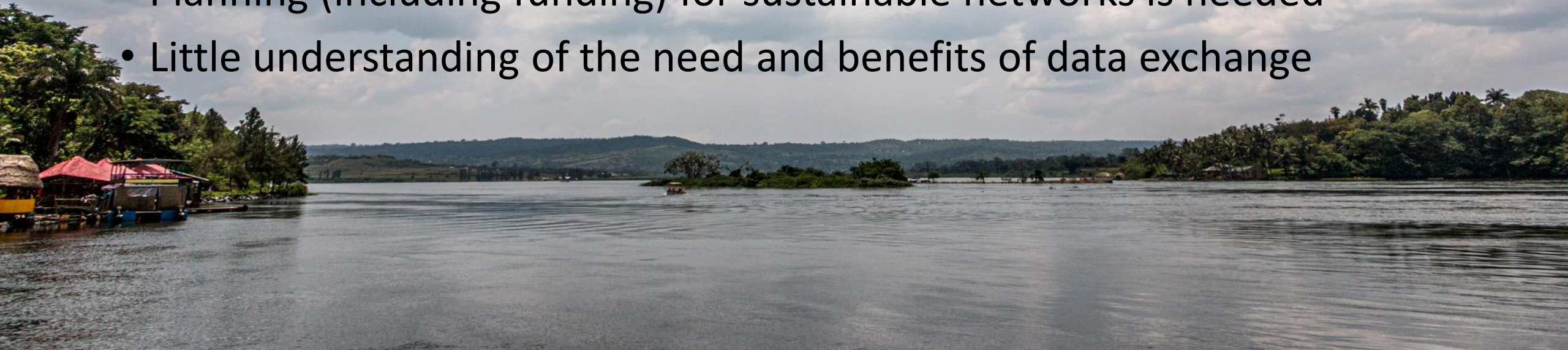


- Countries have very large EEZ and small GDP
- Communications and travel time-consuming and expensive
- Cooperation between countries on procurement, maintenance etc is needed
- WMO is developing the Global Basic Observing Network and finding to address these issues

East Africa – Lake Victoria Region, 2018

Sustainability first – funding second

- Only about 30% of the GCOS Surface Network stations and no GCOS Upper Air stations report as needed
- Funding is not leading to sustainable networks
- Planning (including funding) for sustainable networks is needed
- Little understanding of the need and benefits of data exchange

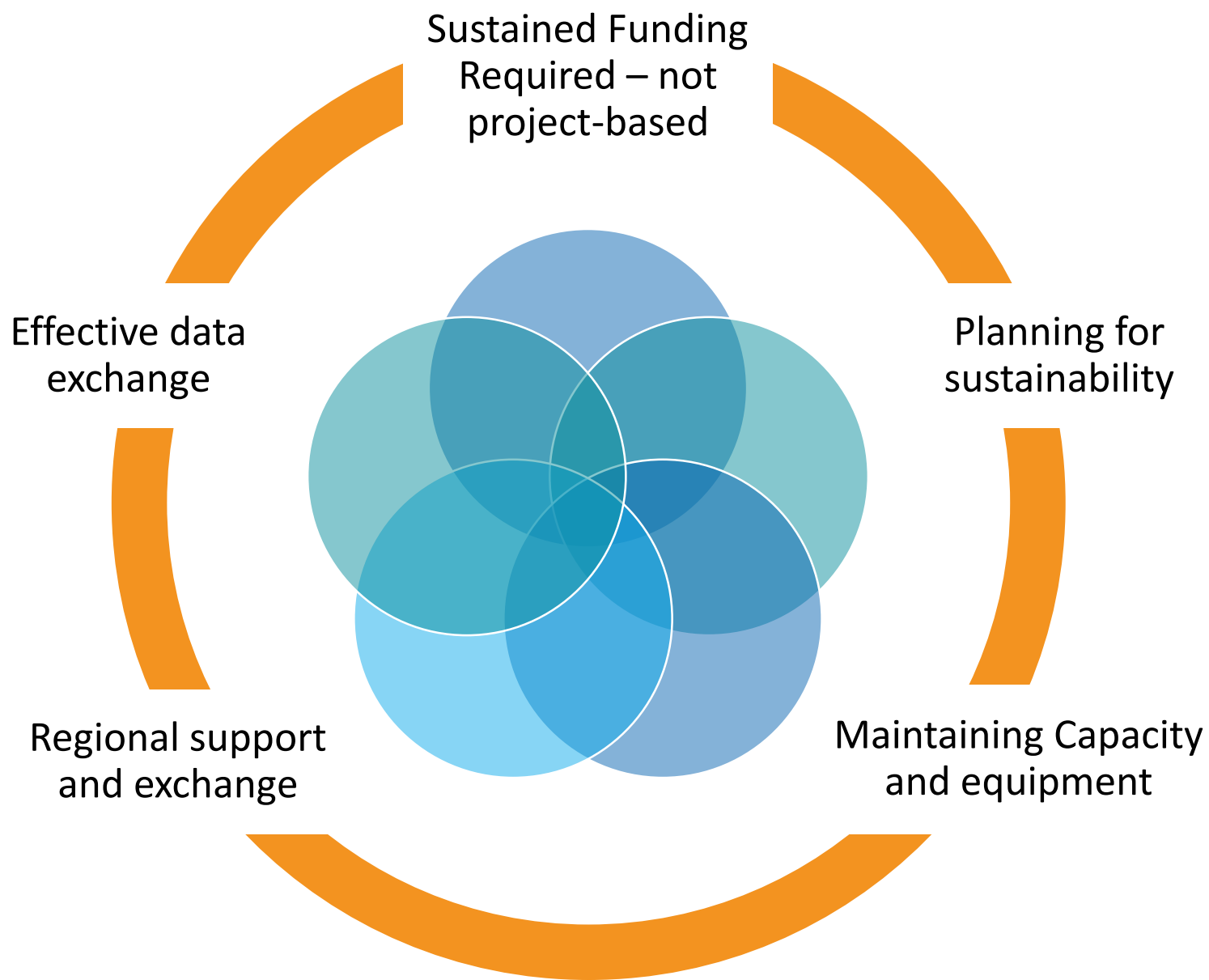


Caribbean Region, 2019

External sustained funding leading to sustained observations

- Coverage of monitoring is generally good
- Upper Air Observations dependent on sustained external funding (USA)
- Technical Issues around data exchange so not all observations are used
- Need for better knowledge and information exchange

Elements of a nationally based sustainable system



Global Basic Observing Network (GBON)

In response to these workshops WMO is establishing GBON – that will provide the minimum data needed to support global climate models, forecasts and projections and weather forecasts.

WMO is developing the **Systematic Observations Financing Facility** that would both support the development of the basic network and its ongoing operation.

GBON would cost about US\$ 750 million by 2025 and lesser amounts thereafter.

Climate Monitoring covers the whole climate system

Weather

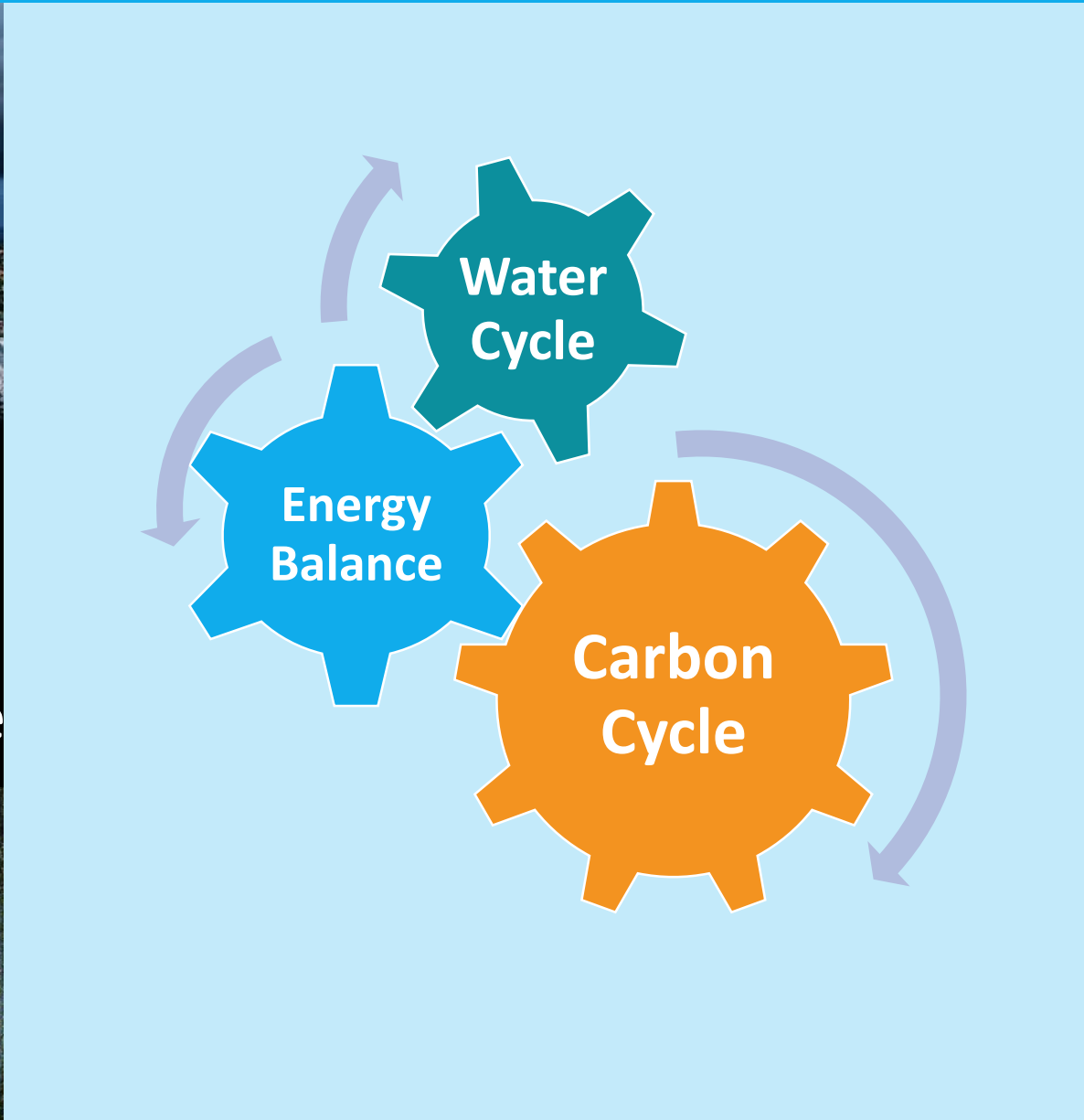


Cryosphere



Biosphere

Work on ECV – new!



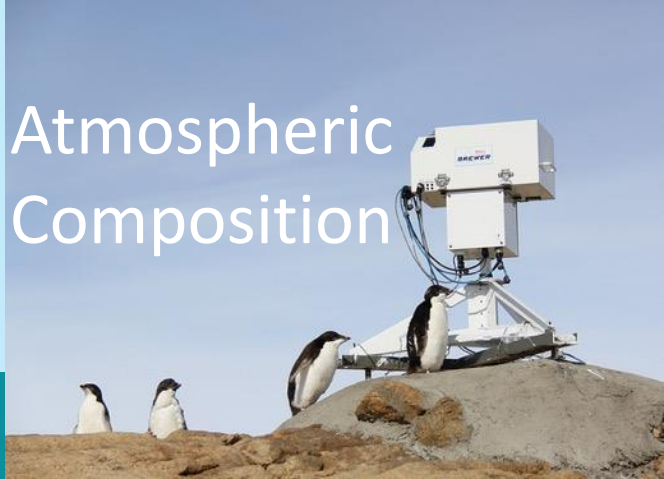
Not just surface and upper air data!



Oceans



Hydrology



Atmospheric Composition

Atmosphere

Surface

- Precipitation
- Pressure
- Radiation budget
- Temperature
- Water vapour
- Wind speed and direction

Upper-air

- Cloud properties
- Earth radiation budget
- Lightning
- Temperature
- Water vapour
- Wind speed and direction

Atmospheric Composition

- Aerosol and ozone precursors
- Aerosols properties
- Carbon dioxide, methane and other greenhouse gases
- Ozone

Ocean

Physical - Surface

- Ocean surface heat flux
- Sea ice
- Sea level
- Sea state
- Sea surface currents
- Sea surface salinity
- Sea surface stress
- Sea surface temperature

Physical - subsurface

- Subsurface currents
- Subsurface salinity
- Subsurface temperature

Biological/ecosystems

- Marine habitat properties
- Plankton

Biogeochemical

- Inorganic carbon
- Nitrous oxide
- Nutrients
- Ocean colour
- Oxygen
- Transient tracers

Essential Climate Variables

ECV

Land

Hydrosphere

- Groundwater
- Lakes
- River discharge

Cryosphere

- Glaciers
- Ice sheets and ice shelves
- Permafrost
- Snow

Anthroposphere

- Anthropogenic Greenhouse gas fluxes
- Anthropogenic water use

Biosphere

- Above-ground biomass
- Albedo
- Evaporation from land
- Fire
- Fraction of absorbed photosynthetically active radiation (FAPAR)
- Land cover
- Leaf area index
- Soil carbon
- Soil moisture
- Land surface temperature

Summary



National surface and upper air observations are a global good and should be funded as such



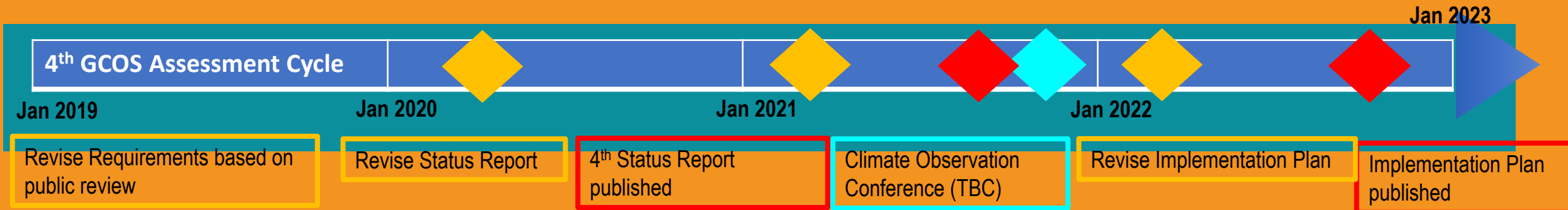
Global support for national meteorological networks is a fundamental part of ensuring adequate sustainable, systematic, climate monitoring



Planning for sustainability first is key



Climate monitoring must also cover the whole climate system: carbon, water and energy. A wide range of observing systems is needed.



Thank you

gcos.wmo.int



GLOBAL CLIMATE
OBSERVING SYSTEM

