International Coordination of Space Weather activities & WMO metadata standards

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IHDEA meeting

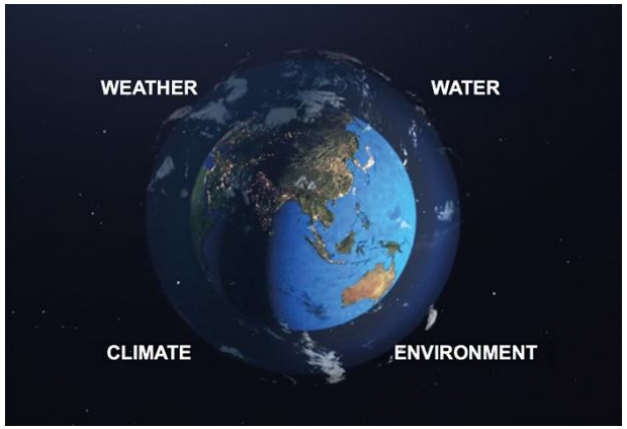
13 October 2023

WORLD METEOROLOGICAL ORGANIZATION

1873 2023 IMO-WMO

World Meteorological Organization

- Founded as International Meteorological Organization (IMO) in 1873
- Established in 1950 as World Meteorological Organization (WMO)
- UN specialized agency and UN authoritative voice for weather, climate, water and environmental services, since 1951
- 193 Member States
- Represented by Directors of National Meteorological and Hydrological Services (NMHSs)



WMO IMO-WMO 1873 2023

WMO Strategic plan 2024-2030

Our Vision

By 2030, we see a world where all nations, especially the most vulnerable, are more resilient to the socioeconomic consequences of **extreme weather, climate, water and other environmental** events; and underpin their sustainable development through the best possible services, whether over land, at sea or in the air.

Our Mission

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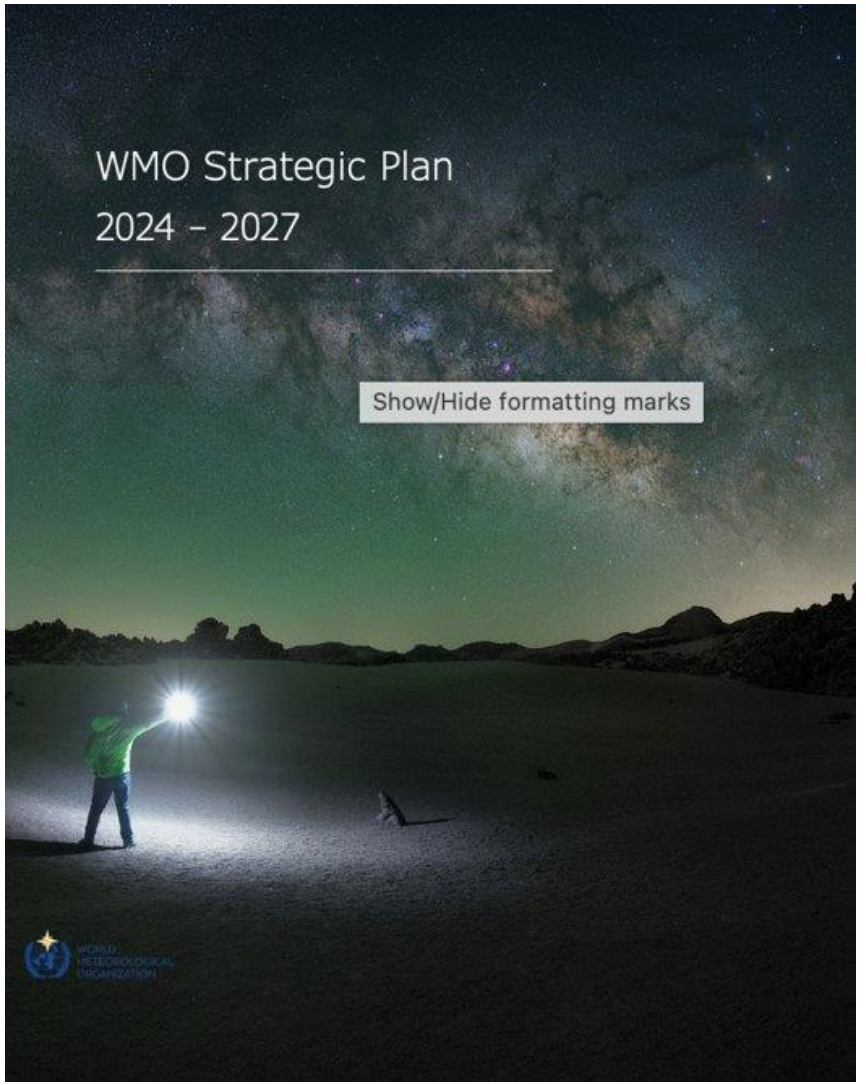


WMO IMO-WMO

WMO and Space Weather

- May 2007, the 15th World Meteorological Congress requested WMO Space Programme office “to consider activities in the area of Space Weather”
- 2009, WMO Space Programme office reports to the 16th Executive Council regarding “the Potential role of WMO in Space Weather”
- Since then, slowly but steadily, presence of Space Weather increased in WMO activities, technical rules and regulations and guidance material e.g.:
  - Since 2012 the WMO Rolling Review of (observing) Requirements does contain Space Weather observables, feeding into Gap analyses (used by e.g. CGMS)
  - Cataloguing of hazardous events (together with UN-DRR) contains Space Weather hazards, also to be included in the Global Multi Hazard Alert System
- Subsequent Technical Commissions: ICTSW (2015-2019) – IPT-SWeISS (2019-2023) - ET-SWx (2022-present)

UNCOPUOS EG on Space Weather

- United Nations Committee for the Peaceful Uses of Outer Space
  - Expert Group on Space Weather
  - after conducting a number of surveys to all Member States and with all relevant International Organisations
  - presented its final report at the Scientific and Technical Subcommittee 59th session in 2022
  - “towards improved international coordination for space weather services” (A/AC.105/C.1/L.401)

6 Recommendations

- R1: Mechanisms to improve Global coordination
- R2: Mechanisms to improve Global information sharing
- R3: Improved Space Agency Mission coordination
- R4: Support Transition and Implementation
- R5 & R6: Multilateral Cooperation

- In general: increase coordinated collaboration, building on and optimising existing and ongoing efforts within the community, minimising duplication of effort.

R1: UNCOPUOS Letter 1 July 2022

- To:
  - International Space Environment Service (ISES)
  - World Meteorological Organisation (WMO)
  - Committee on Space Research (COSPAR)
- requesting COSPAR, ISES & WMO lead efforts to improve the global coordination of space weather activities in consultation and collaboration with other relevant actors and international organizations, including COPUOS.
- And that member States that are also members of, or are represented at, COSPAR, ISES or WMO engage with those organizations to encourage a response to COPUOS outlining the efforts they will undertake towards the goal of establishing a potential path forward to improve global coordination and collaboration.

Response

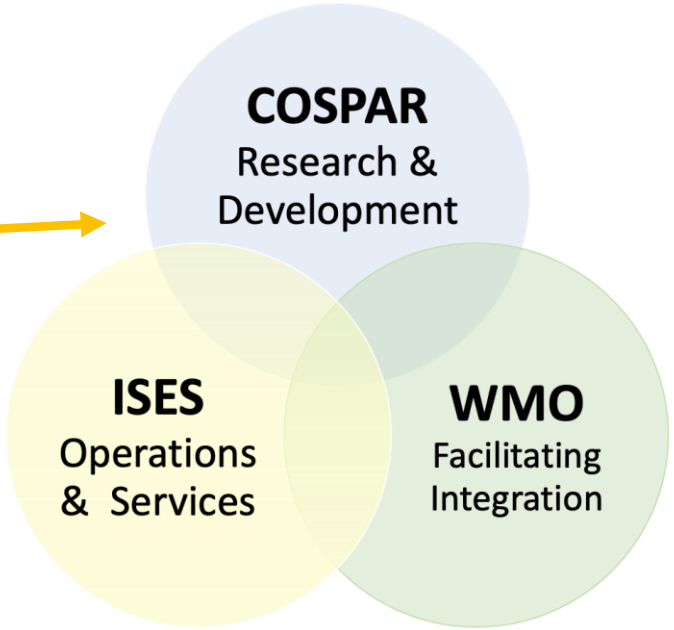
- Coimbra ‘Brainstorm’ with 2 representatives form each organisation
  - For each organisation: overview, members, primary focus, strengths, deliverables, etc
  - High-level basis where each organisation could potentially lead efforts, with others contributing
  - Draft ‘Coimbra Declaration’
  - Initial discussion around ‘pilot-projects’ - actions to demo benefit of COSPAR-ISES-WMO working together
  - Future regular meetings, future pathway

Coimbra declaration

- To respond positively to UNCOPUOS, to take a leadership role, as equal partners, in delivering improved coordination of SWx

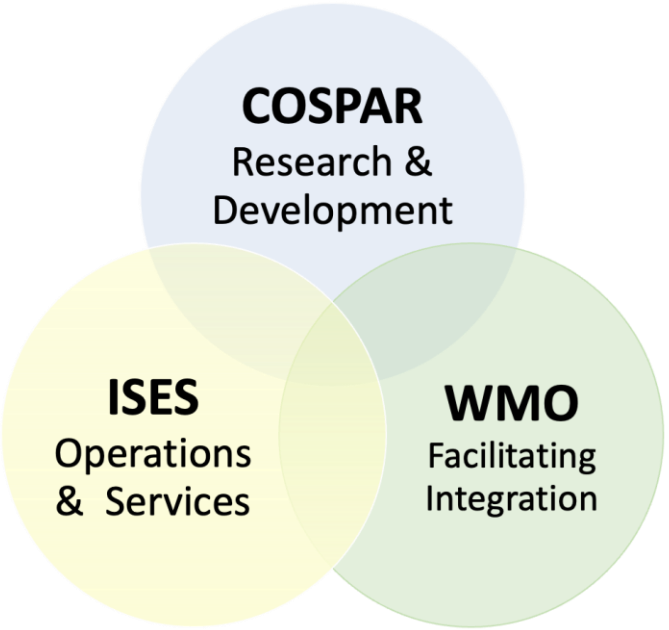
- To proceed in collaboration with others - with the three leading in distinct domains
  & to define overarching activities where there's overlap (e.g. R2O2R transitions, Capacity building, Collaboration for a global warning system)

- To add cross-membership between the three organisations on the relevant committees/groups - to facilitate improved info flow (e.g. WMO & ISES representatives at COSPAR PSW)



Coimbra declaration

- To work towards formalising partnership e.g. an ‘MoU’
- To define pilot-projects for collaborative activities
- To meet regularly (every 6 months + virtual meetings + meetings with broader community) - towards improved coordination, on-going activities, action plans
- To report back to UNCOPUOS, Feb ‘23, formal statement at STSC 60th Session
- To organise an International SWx Coordination Forum to engage with other international organisations in the coordination efforts



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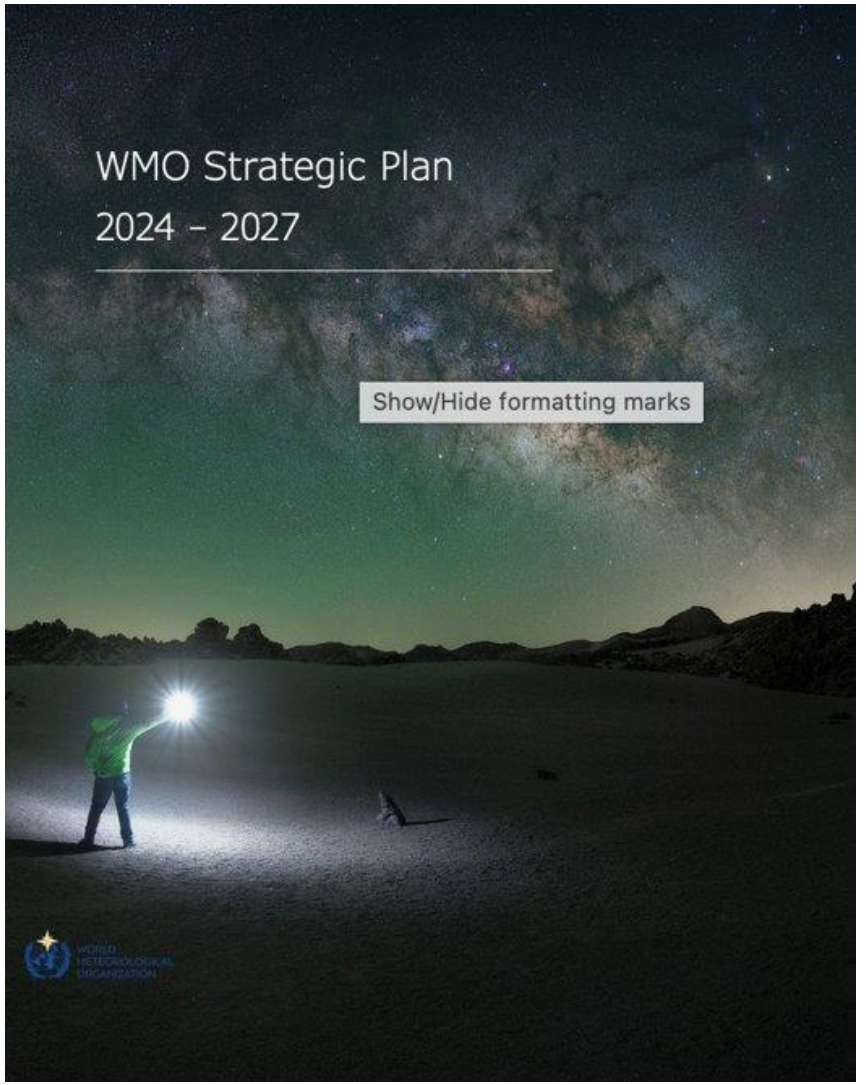
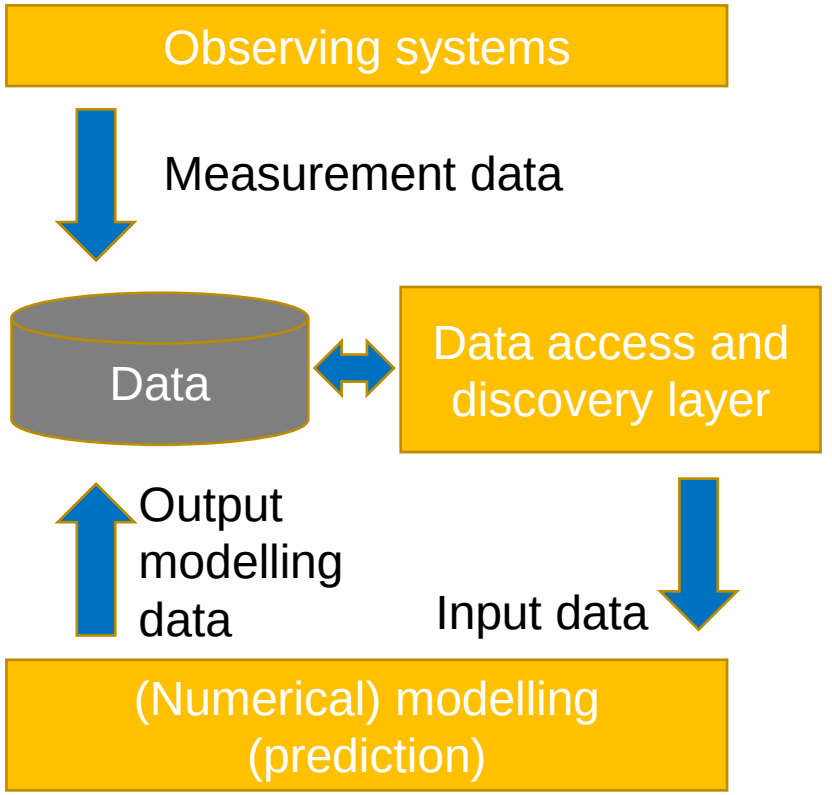


WMO Infrastructure

- WIGOS:
  WMO Integrated Global Observing System

- WIS:
  WMO Information System
  WIS 2.0 (being rolled out) is no longer an actual data transport platform (data are pushed) but a discovery and notification platform (notifications are pushed but data is pulled). The regular internet is used as data transport mechanism with the platform additionally offering a cache for part of the data.

- WIPPS:
  WMO Information Processing and Prediction System
  (formerly known as GDPFS Global Data Processing and Forecasting System)



WMO (Metadata) standards

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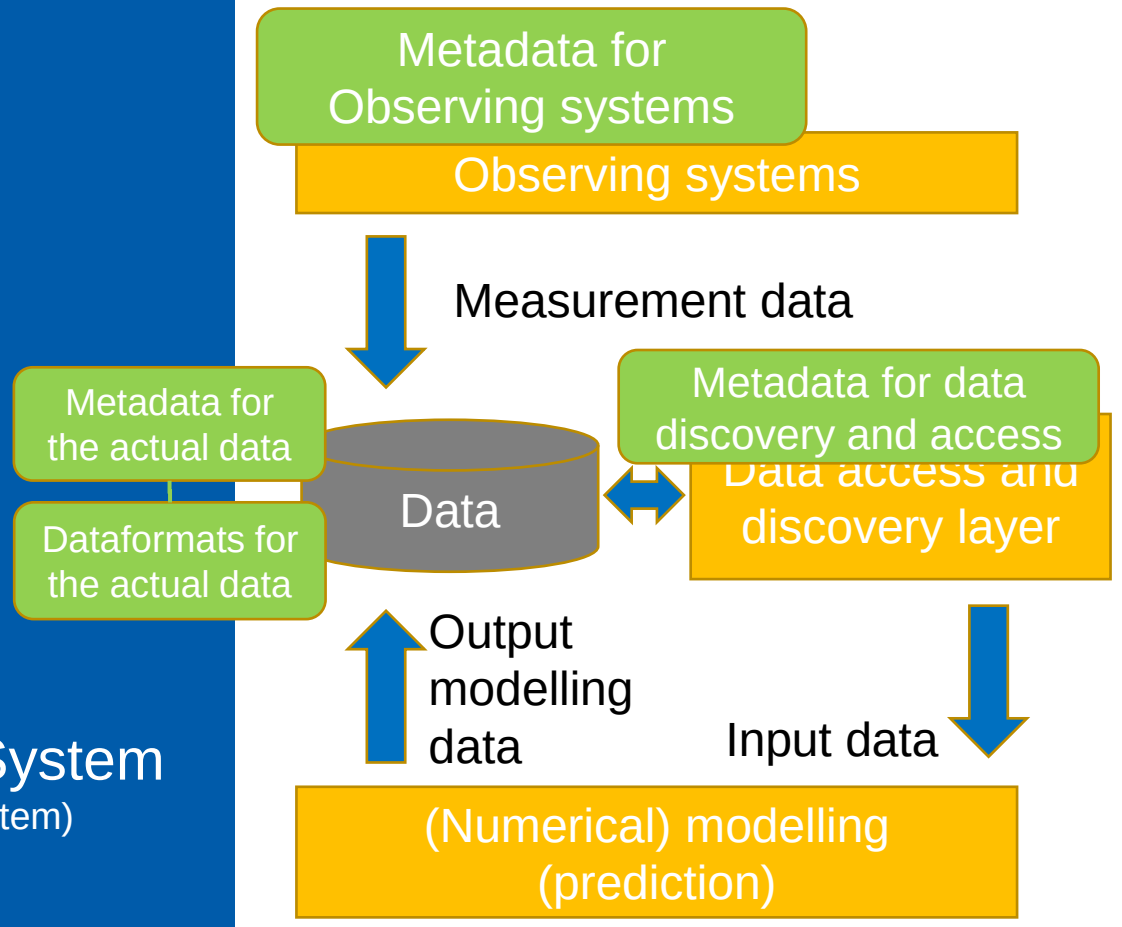

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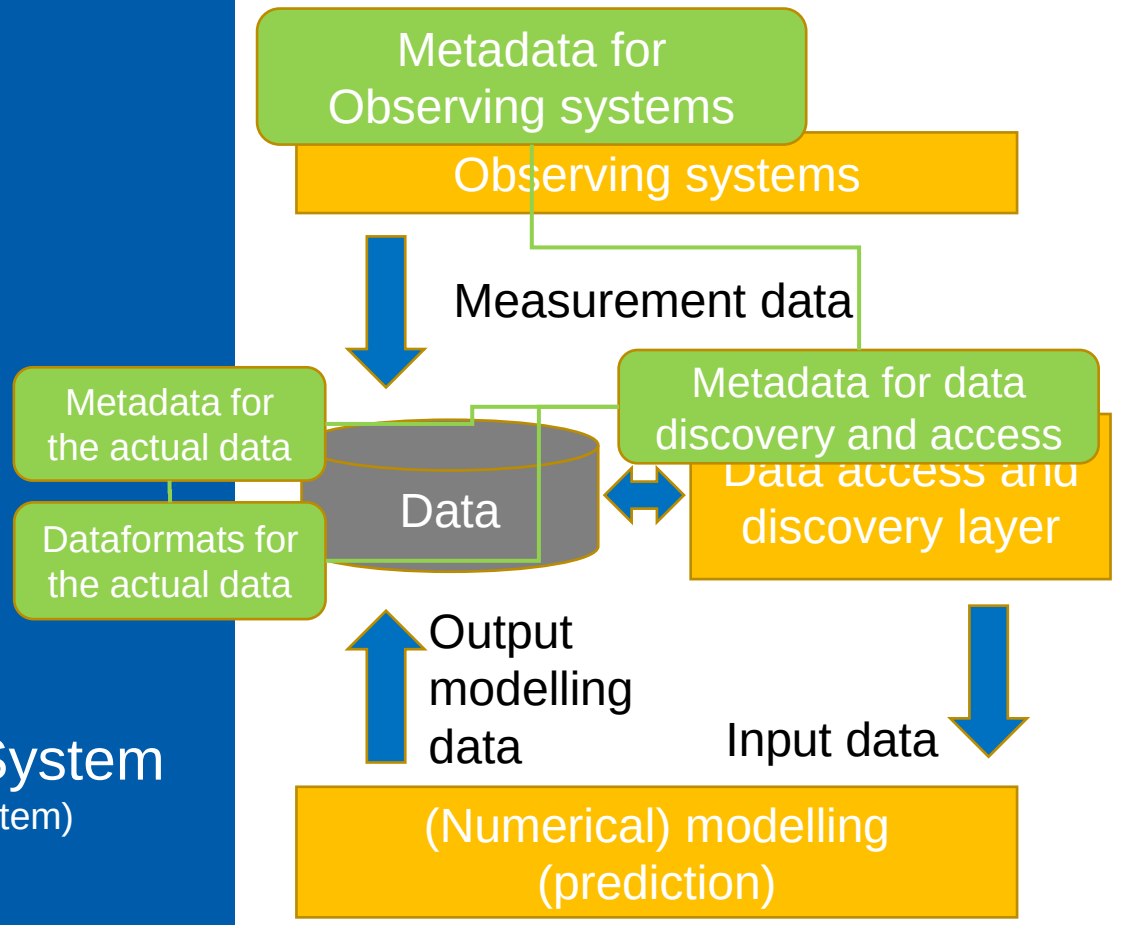

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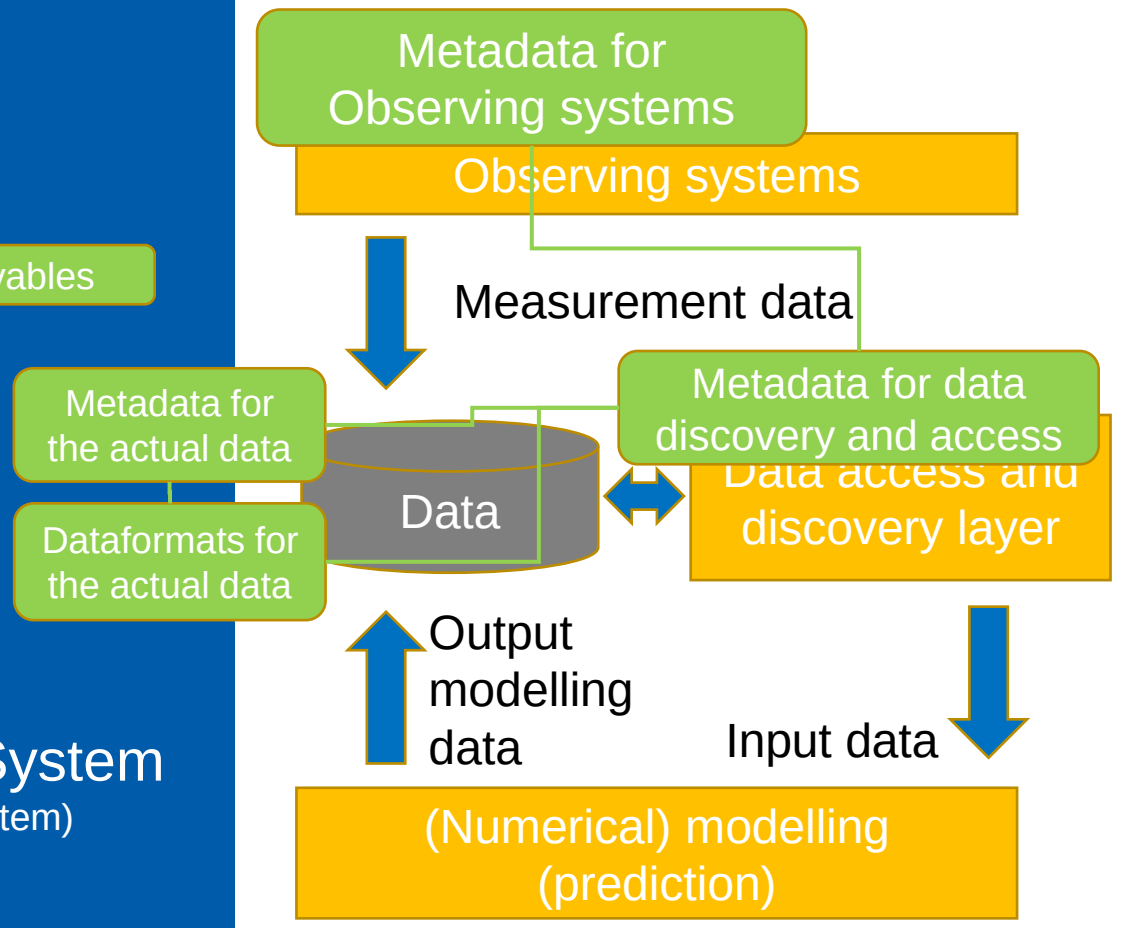

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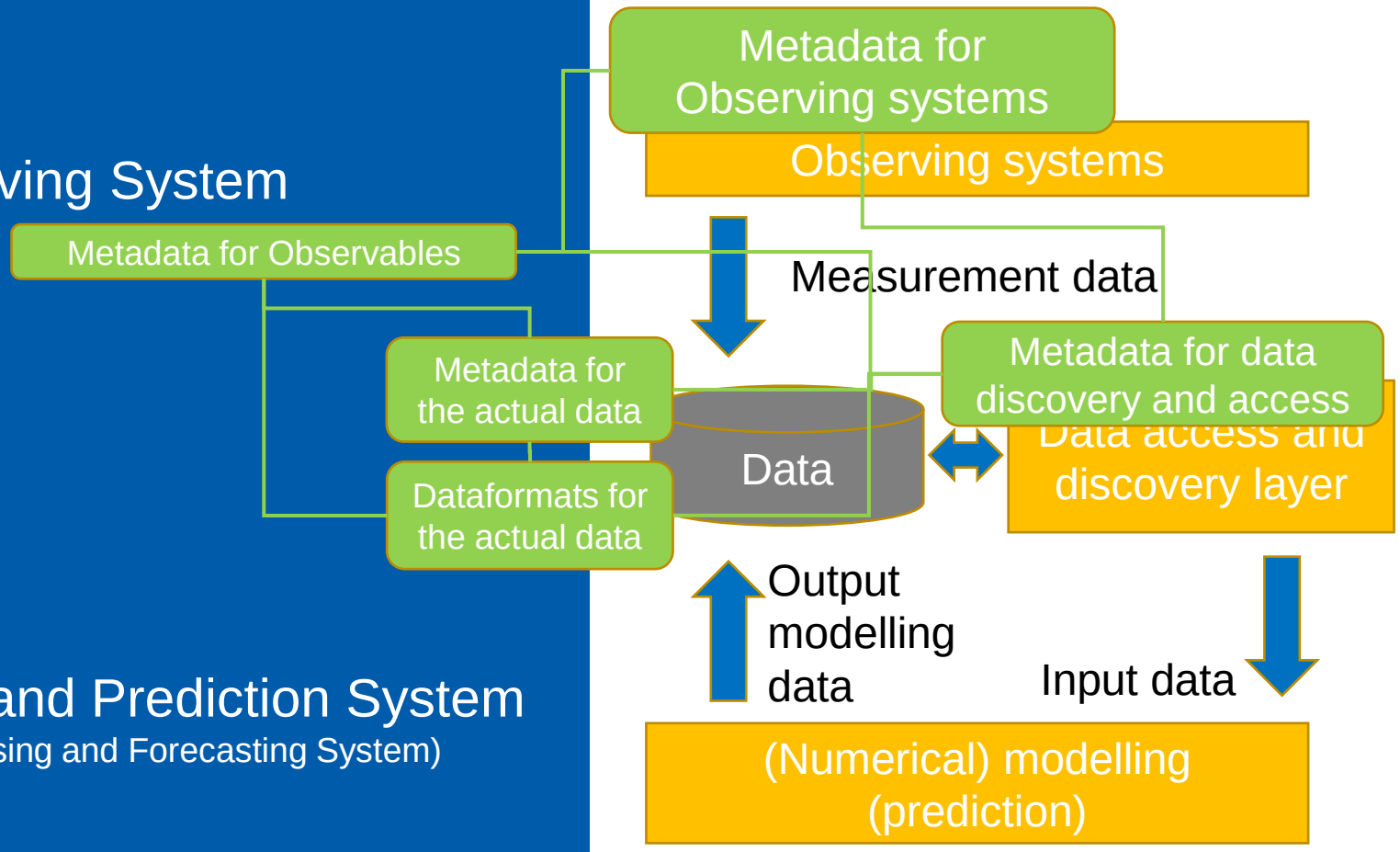

Thoughts

- Even when there are good reasons to maintain different systems in parallel some consistency in metadata standards would be beneficial.

- Coverage of Space Weather and heliophysical metadata in WMO metadata standards is still limited but needs to occur and work for that is ongoing:
  - We better make sure we avoid inconsistencies between WMO metadata and other systems and metadata-models to the extent possible
  - The ability and need for consistency may vary across the areas or system components indicated in the graph
  - Integration in WMO systems could be simplified by identifying in which areas or system components consistency is needed and where not.

Thank you

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