IMPROVING VOS DATA MANAGEMENT:

An update on progress from JCOMM Task Team on Delayed Mode VOS (TT-DMVOS)

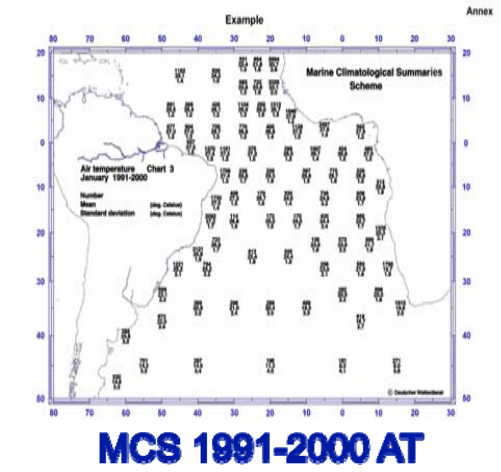
Co-Chairs:
Nicola Scott, GCC UK
Gudrun Rosenhagen, GCC Germany

With contributions from Scott Woodruff, Chair ETMC, USA

Outline

- Introduction to MCSS
- Background of TT-DMVOS & TT-MOCS
- Goals & Tasks of the Team
- Achievements so far
- Idealised Future Data Flow
- Work in Progress & Future Plans

Introduction to MCSS



MCSS – JCOMM's Marine Climatological Summaries Scheme

Established in 1963

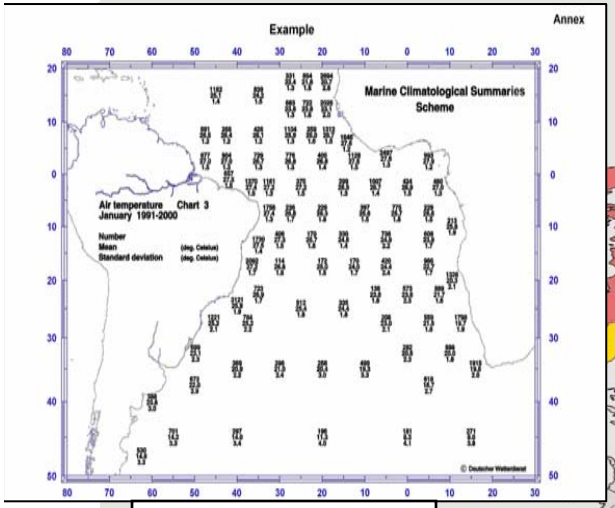
MAIN PURPOSE

1. Gather DM VOS CLIMATE data – from 26 CMs in IMMT format
2. Perform QC – using MQCS (v6)
3. Store data & allow access – by 8 RMs
4. Generate a usable climate product – Climate summaries

IMPROVED

In 1993 Global Collecting Centres (GCCs) were introduced to encourage data flow to RMs and help improve data quality

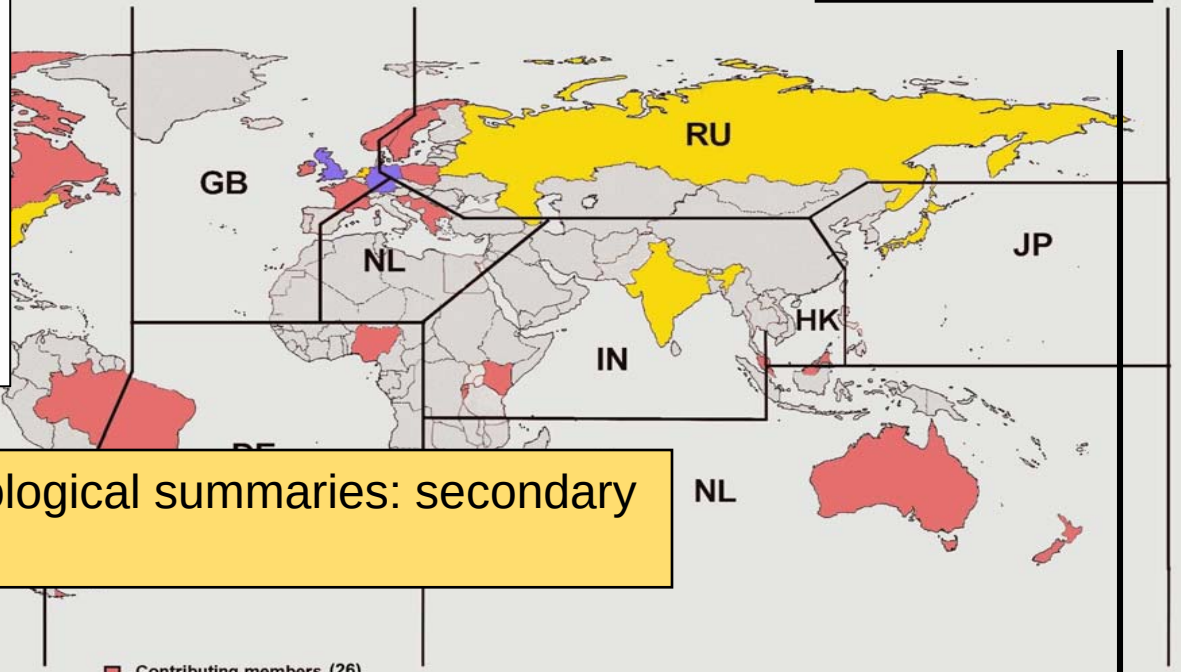
Introduction to MCSS



1991-2000 AT

MCSS

26 Contributing Members (CMs)

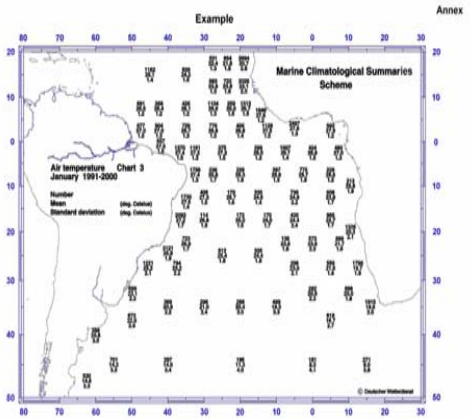


Production of climatological summaries: secondary aspect of MCSS

8 Responsible Members (RMs)

1993: 2 Global Collecting Centres (GCCs)

Introduction to MCSS



MCS 1991-2000 AT

- Two longstanding components (est. 1963)
  1) Delayed-mode VOS data management
     - Note: MCSS now archives some non-ship data
  2) Summaries (**MCS**): tabular/graphical products
- Modernization started 2007 via two new Task Teams
  1) Delayed-Mode (DM) VOS data: **TT-DMVOS**
  2) Marine-met. and Oceanographic Climatological Summaries: **TT-MOCS**

Background of TT-DMVOS & TT-MOCS

The Terms of Reference for the TT-DMVOS were agreed upon at ETMC-II and SOT-IV in 2007.

It is a self-funded Task Team which primarily works via email.

FOCUS: Working with TT-MOCS to Modernise the Marine Climatological Summaries Scheme (MCSS)

Background: Membership

From ETMC:

- GCCs as two Co-chairs
- Plus RMs on ETMC, etc.

From SOT:

- Chair + VOSPanel Chair
- SOOP, ASAP, etc.
- US NOAA/NCDC (E. Freeman)
- SAMOS (S. Smith)

<u>Reporting mechanisms</u>

- Project plan
- Reporting to ETMC and SOT

Goals & Tasks of the Team

- **Modernization of the Marine Climatological Summaries Scheme - MCSS**
  - streamline data flow
  - manage and update IMMT format and MQCS
  - ✓ IMMT (MQCS) changes adopted by JCOMM-III
  - Define and develop a more advanced QC system
  - Identify a suitable single-point data store
  - Contribute in development of modern end-products – liaise with TT-MOCS
- **Explore possible convergences**
  - ✓ IMMA format (ICOADS)
  - GTS, satellite etc.
  - SAMOS and GOSUD

Achievements so far: Meetings

- 3-year work-plan established – making good progress through work load although behind planned time scale.

- Meetings to date: 3 joint TT-DMVOS / TT-MOCS meetings (’08, ’09 & ‘11) & 2 GCC meetings (’07 & ’09)

- Planned meetings:
    - GCC meeting in Edinburgh in September 2011

Achievements so far: Questionnaires

Questionnaire sent to NMHS throughout the world in Dec 2007 – responses identified 26 CMs now willing to contribute data to MCSS (previously 41). Knowing this figure allows setting goals for CM contributions to be realistic.

26 countries still run a VOS fleet and are willing to contribute data to the MCSS

20 of the 26 countries have contributed in the last 3 years!

Questionnaire sent to 8 RMs in May 2008 to gain feedback on modernisation plans & RMs future role

Responses identified RMs generally wanted to involved in future MCSS process even if responsibilities changed.

Achievements so far: IMMT/MQCS

IMMT-4 & MQCS-6 have been developed and adopted at JCOMM-III for general use by 1st January 2011.

Better reporting of source of observation & platform

Significant Changes include the addition of AWS indicator, VOSClim Indicator, IMO number & relative humidity.

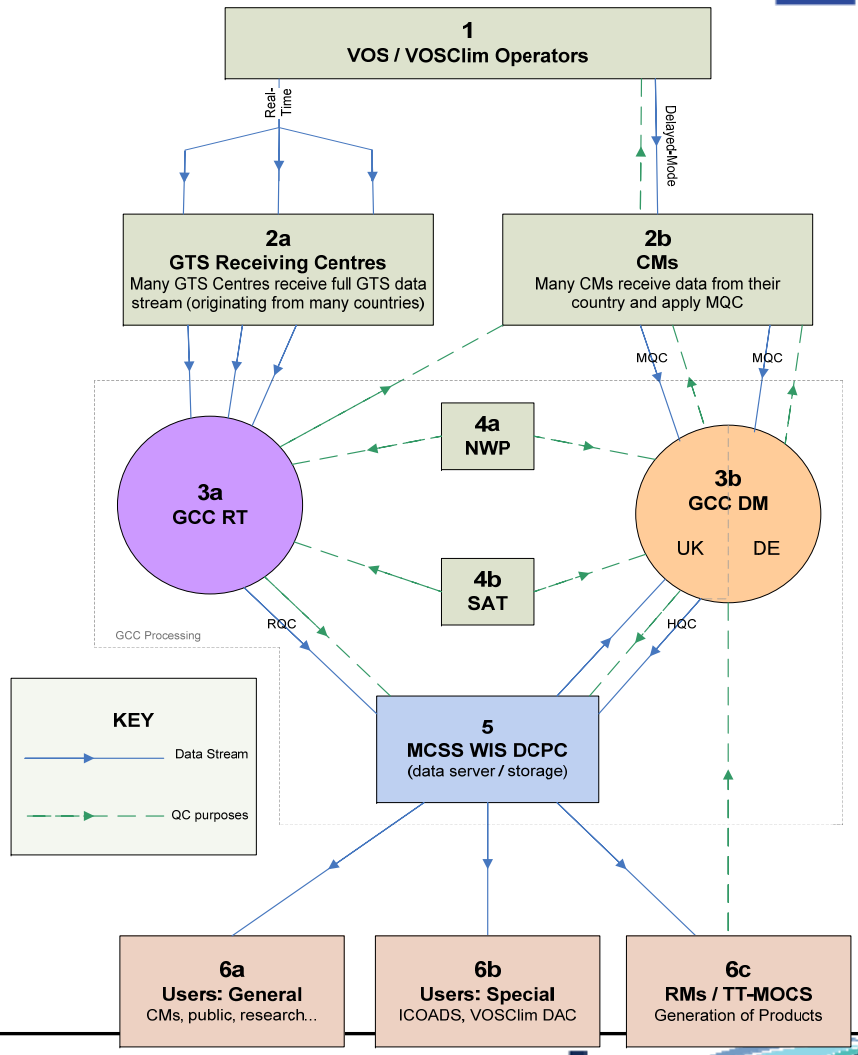
Source of observation	**0 – Unknown** **1 – Logbook (paper)** **2 – National Telecommunication channels** **3 – National Publications** **4 – Logbook (electronic)** **5 – Global Telecommunication channels (GTS)** **6 – International Publications**
Observation platform	**0 – Unknown** **1 – Selected ship** **2 – Supplementary ship** **3 – Auxiliary ship** **4 – Registered VOSClim ship** **5 – Fixed sea station (e.g., rig or platform)** **6 – Coastal station** **9 – Others/data buoy**
Relative humidity	**Tenths of Percentage**

DATA FLOW

Future Data-Flow: VOS

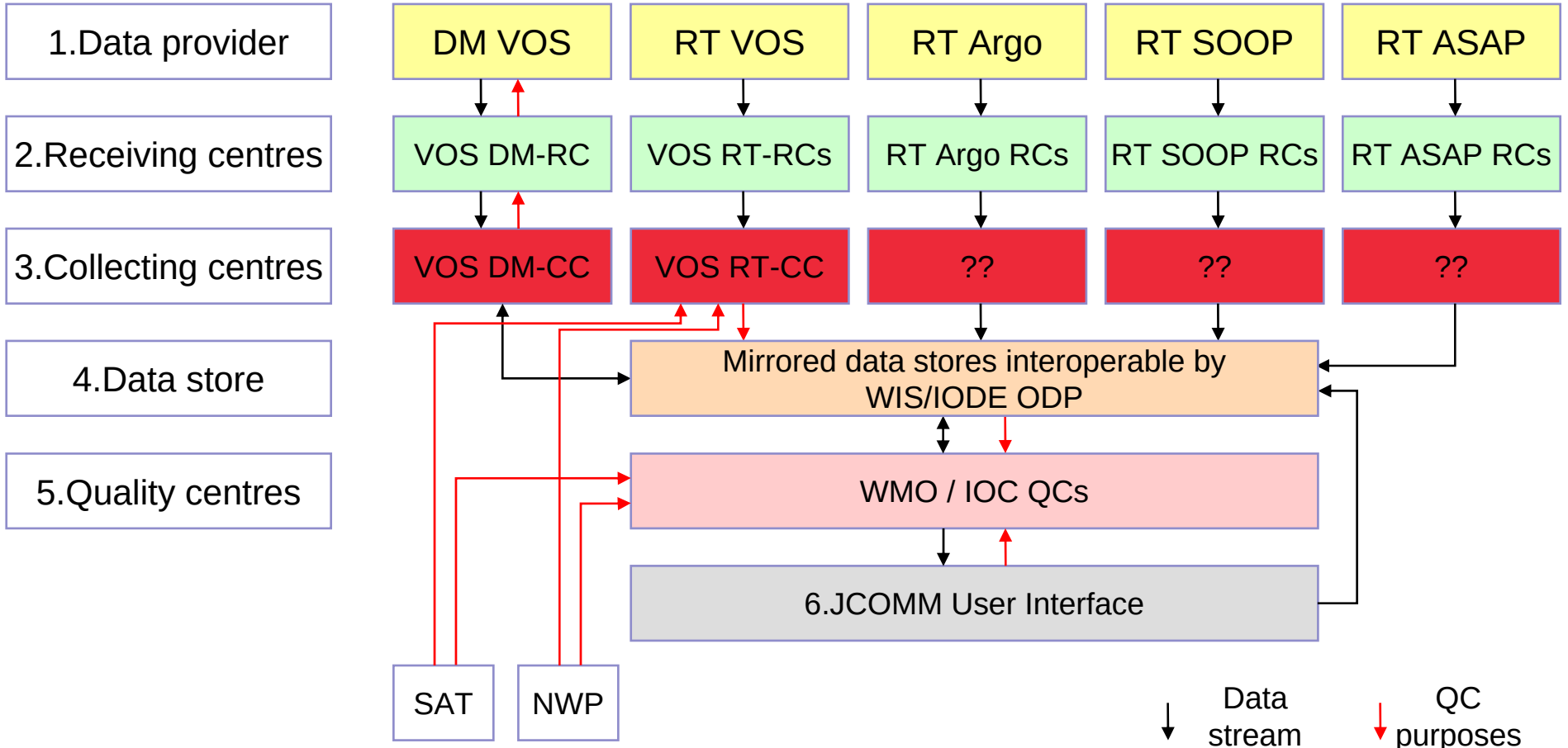
proposed data flow, roles & responsibilities

The modernised data-flow has been widely discussed (CLIMAR-III & JCOMM-III & ETMC III) and, in principle, generally agreed.



Idealised Future Data-Flow: Widening the Scope

JCOMM Marine Climate Data System (MCDS)



Idealised Future Data-Flow: Widening the Scope

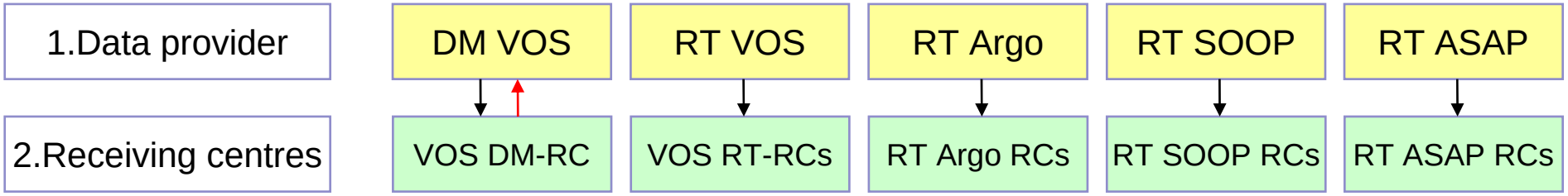
JCOMM Marine Climate Data System (MCDS)

1.Data provider	DM VOS	RT VOS	RT Argo	RT SOOP	RT ASAP

1. **JCOMM Observation Platforms:** The platforms (ships, buoys, rigs, platforms, moored buoys, islands, Argo floats, XBTs,…….) providing meteorological and/or oceanographic observations manually or automatically in real-time (GTS) and/or delayed mode.

Idealised Future Data-Flow: Widening the Scope

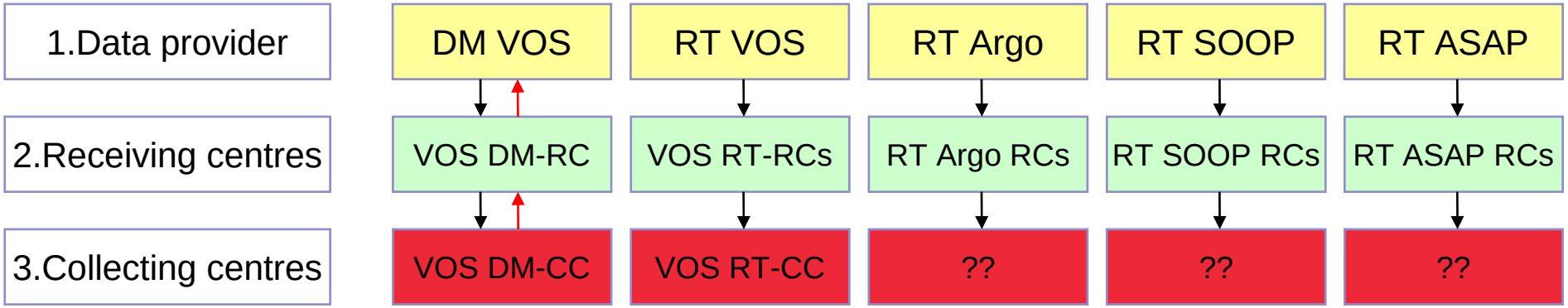
JCOMM Marine Climate Data System (MCDS)



2. **JCOMM Receiving Centres (RCs):** Selected centres receiving GTS and DM data with their existing tasks (e.g.CMs, …) Their role is to forward all JCOMM data that comes to them to the relevant Collecting Centre on a regular basis depending on data type in defined data codes.

Idealised Future Data-Flow: Widening the Scope

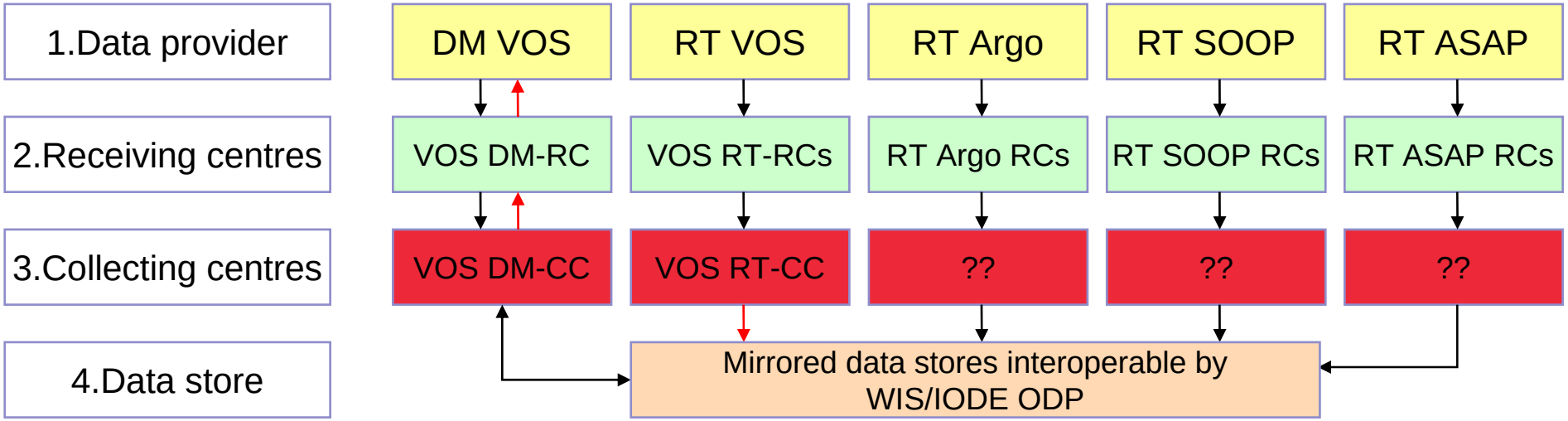
JCOMM Marine Climate Data System (MCDS)



3. **JCOMM Collecting Centres (CCs)**: Selected centres combining data of all streams from the appropriate Receiving Centres. Their role is to establish a harmonised, complete dataset, perform quality checks and store the data with flags centrally accessible by WIS/IODE ODP. It is mandatory that the Collecting Centres are registered as WIS DCPCs.

Idealised Future Data-Flow: Widening the Scope

JCOMM Marine Climate Data System (MCDS)

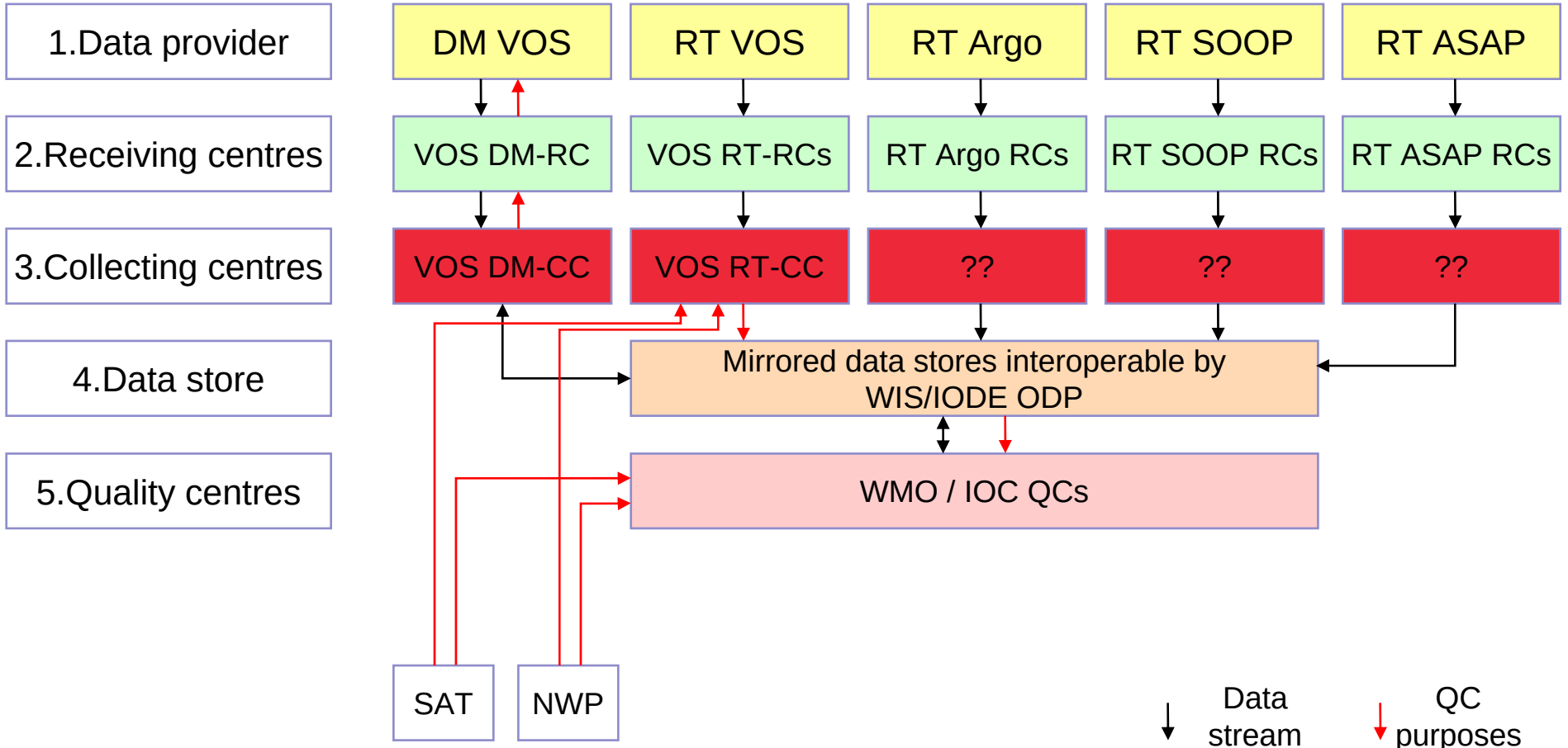


4. JCOMM Data Storage: All data (original & QC'd) and metadata from all collecting centres are forwarded to suitable mirrored data stores (ref. CMOCs proposal) according to data type. Data and metadata must be stored in line with defined JCOMM standards to ensure data integrity and universal interoperability.

All data stores must be visible by the WIS/IODE ODP.

Idealised Future Data-Flow: Widening the Scope

JCOMM Marine Climate Data System (MCDS)



Idealised Future Data-Flow: Widening the Scope

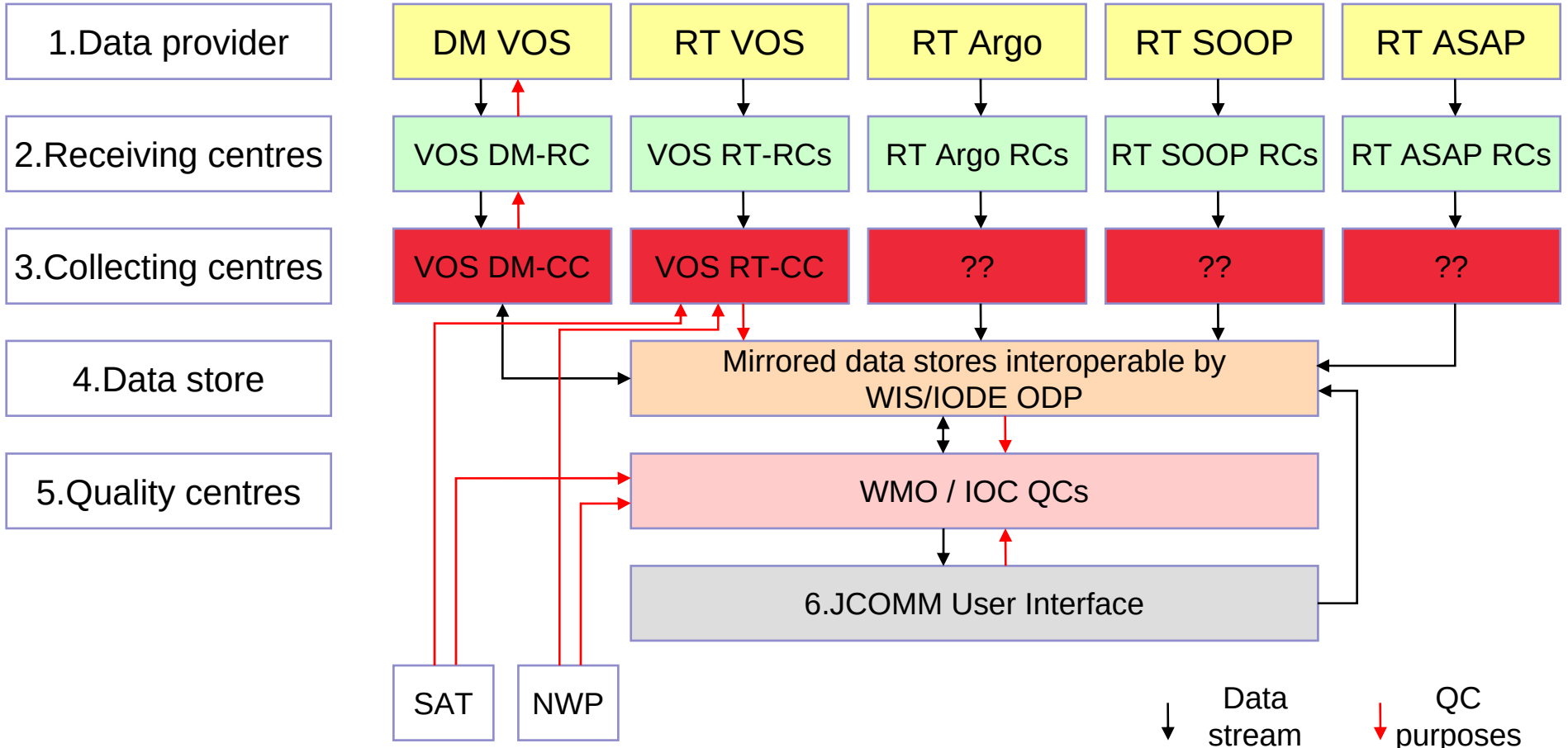
JCOMM Marine Climate Data System (MCDS)

5. JCOMM Quality Centres (QCs): Selected centres from WMO and IOC applying the Higher Quality Control Standard (HQCS) to data within the JCOMM Data Store.

HQC could include land-position checks, comprehensive element inter-comparisons and time-sequence checks, as well as data comparisons with defined climatologies, e.g. 40 years' ECMWF reanalysis, real-time monitoring data, NWP Model Output and Satellite data.

Idealised Future Data-Flow: Widening the Scope

JCOMM Marine Climate Data System (MCDS)



Idealised Future Data-Flow: Widening the Scope

JCOMM Marine Climate Data System (MCDS)

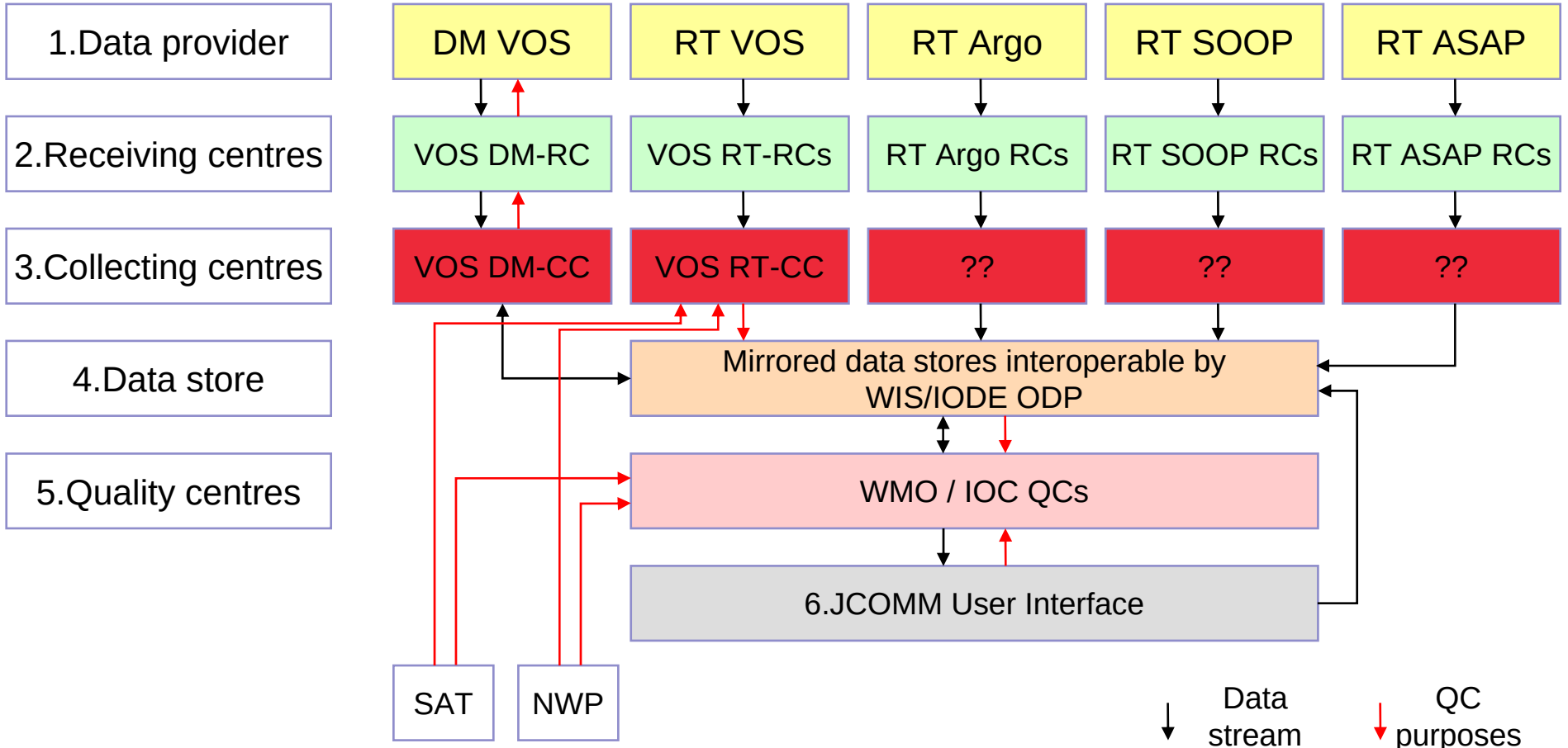
6. JCOMM User Interface: Universal user interface for: searching, downloading, displaying and analysis of all JCOMM data. It provides a flexible tool with variable privileges for all users (RCs, CCs, general users, special users) to manipulate the data.

In particular the tool could allow:

- Interactive searching by element, time, location, geographical feature, data type
- Fast and easy downloading into various codes and formats
- Interactive displays – maps, tables – allowing GIS layering
- Versatile analysis to generate and visualise standardised and bespoke climatological products and statistics in suitable forms
- Responsible Members (RMs) to develop regional climate products

Idealised Future Data-Flow: Widening the Scope

JCOMM Marine Climate Data System (MCDS)



HQCS

Work in Progress: HQCS

A much more advanced QC system has been proposed called The Higher Quality Control Standard (HQCS).

HQCS will initially include:

- more detailed MQCS checks/flagging
- on-land position improvements
- climatology comparisons

HQCS will aspire to include:

- NWP model output comparisons
- Satellite comparisons

Work in Progress: HQCS

- All **original** data stored in a **primary archive.**

- Automated system comprising a variety of advanced QC measures.
- Corrections of problems with date, time, and position, by checking with CMs (**secondary archive**),
- Identification of suspicious values,
- **Traceability** (flags for every element and stage of QC).

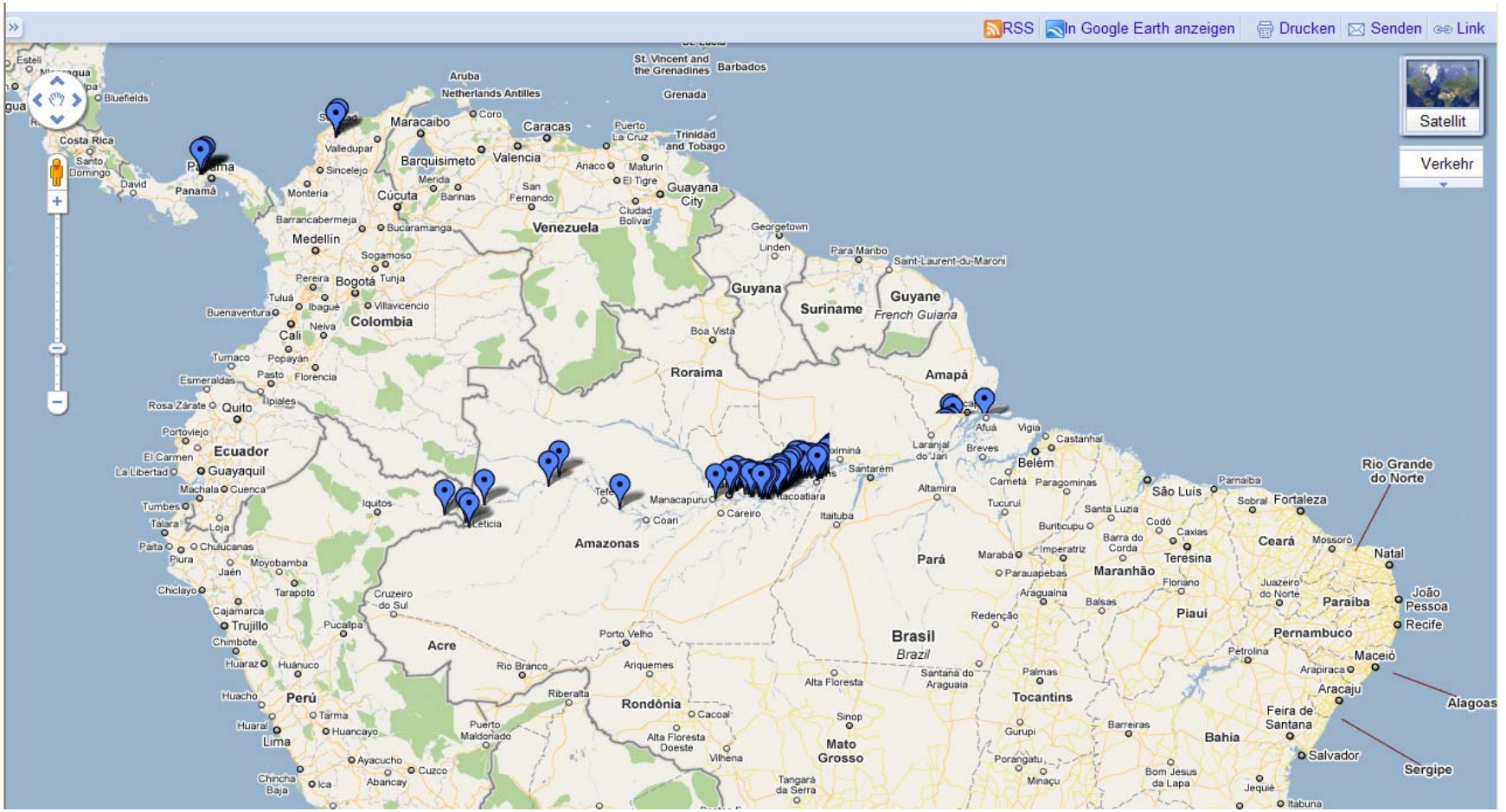
- Easy maintenance of the HQC-software,
- For use with different purposes, formats and data types (ship/buoys/rigs),
- Graphic presentation of suspicious data,
- Easy/automatic flag setting and identification/changes of suspicious/erroneous data.

Problem with existing MQC land mask for on-land data identity

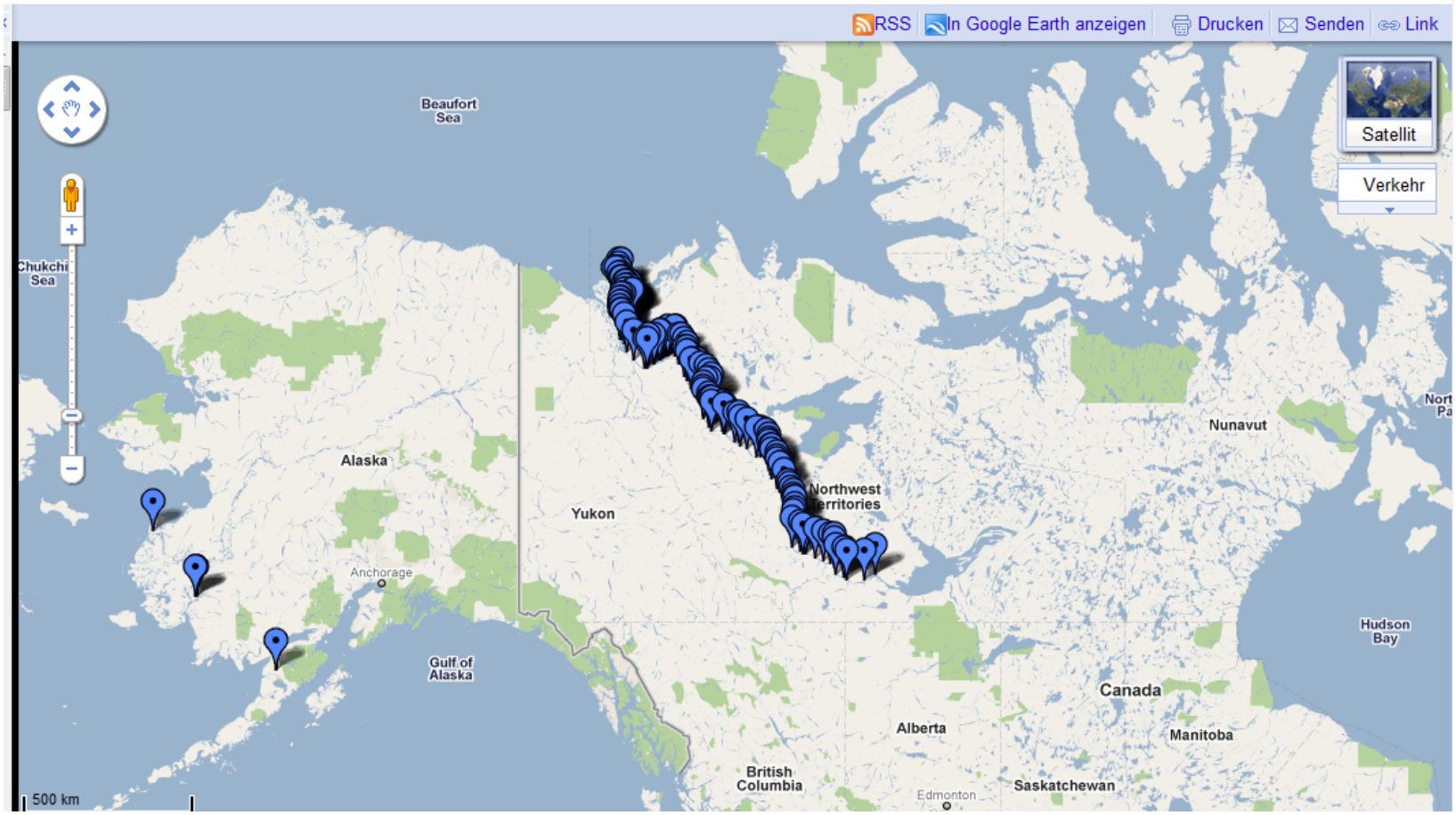
- only 0.01 degree resolution

So these erroneous data identified…….

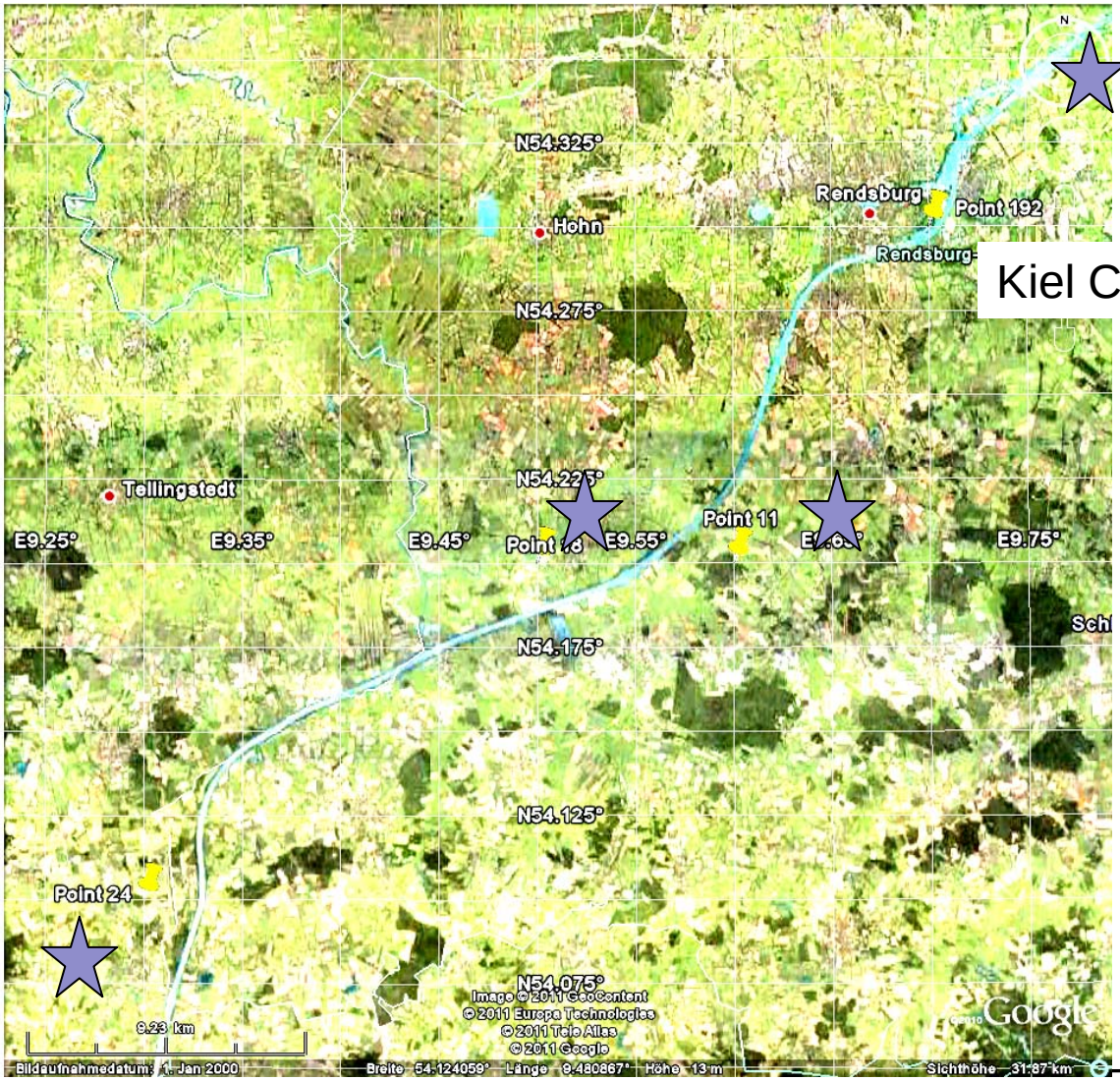
Work in Progress: HQCS



Work in Progress: HQCS

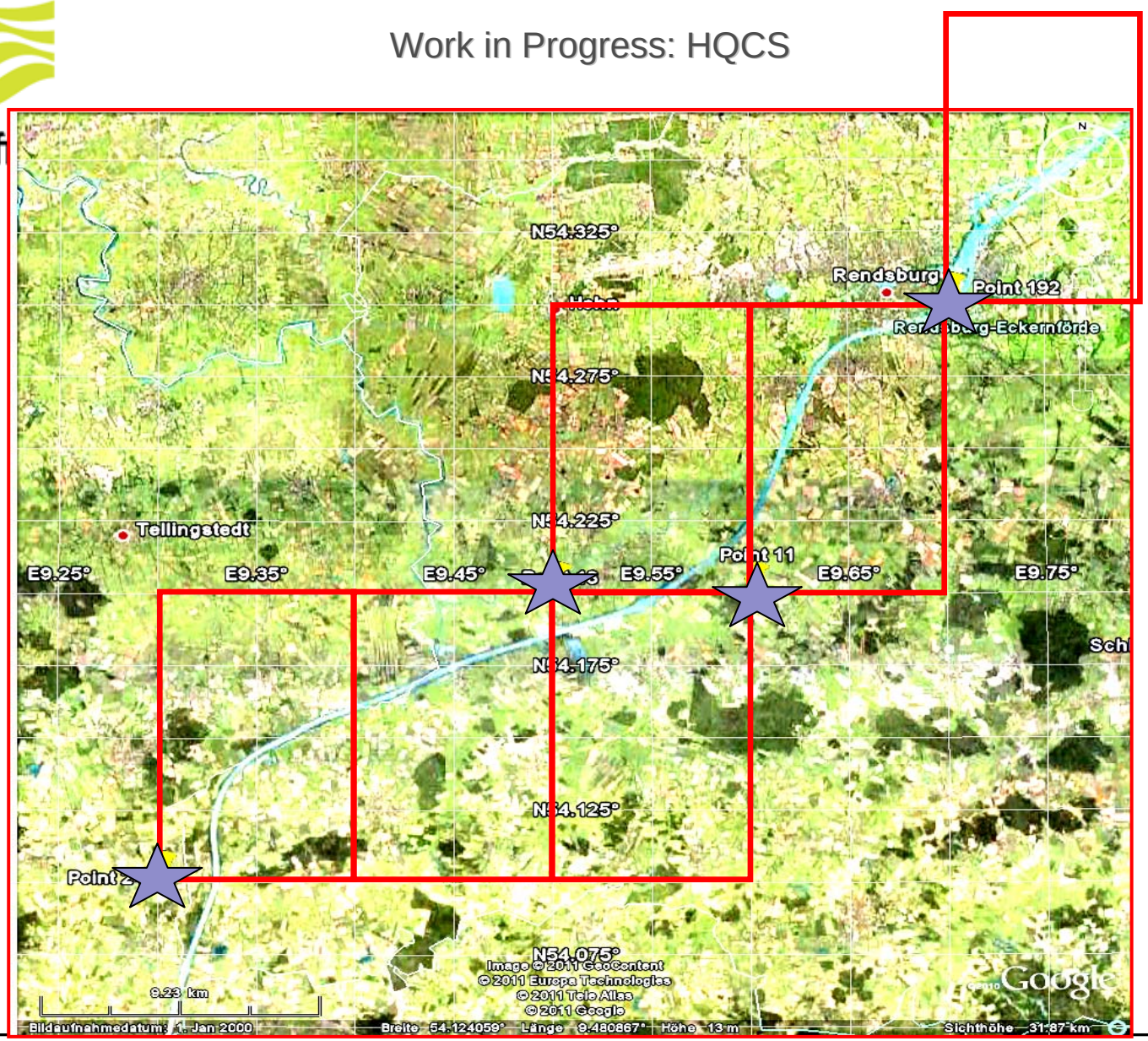


Work in Progress: HQCS



Kiel Canal

Work in Progress: HQCS



HQCS has much more detailed land mask with rivers that has been created manually

Must also allow 0.15 degree tolerence around positions due to 0.1 degree resolution

Further checks:

- **Range checks**
  - according to element
- **Time sequence checks**
  - Course and speed: Verification of covered distance
  - Check of rate of change with defined tolerances by parameter
- **Comparisons with neighbours**
  - Differences with neighbouring observations (inc defined radius, tolerance, land-influence)
- **Stuck checks**
  - Check of lapsed time without change in element value

Comparison with defined climatology

ECMWF 40 Year Re-analysis (ERA-40)

- Fields are analyses for 0000, 0600, 1200 and 1800 UTC each day;
- Each parameter as a field of grid points at 1 ° resolution;
- Parameters for comparisons:
  - 2 metre dewpoint temperature,
  - 2 metre air temperature,
  - MSL pressure,
  - SST

HQCS still to consider

- Further tests are necessary, definitions of tolerances
- Additional checks?
- Proposed QC standards need to be aligned with existing international procedures (formats, flagging…).
- Implementation of further comparisons

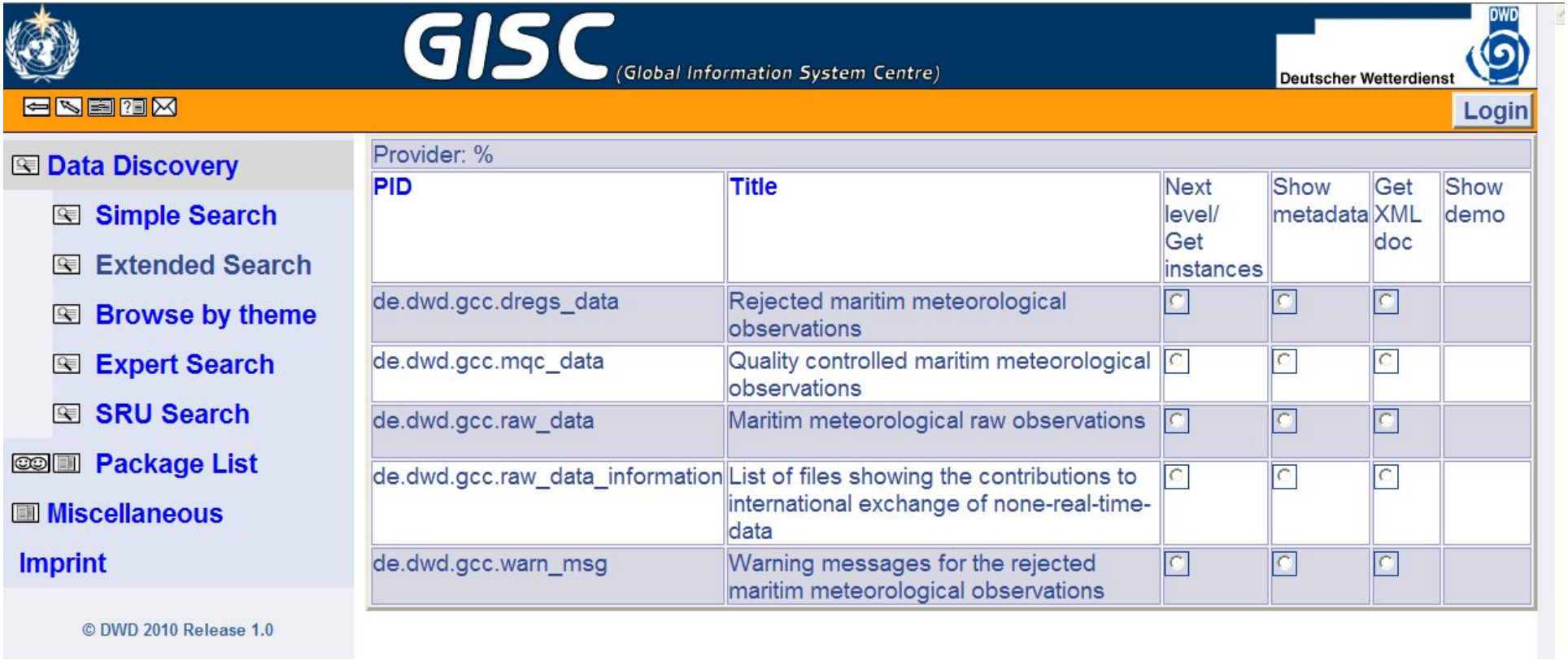
Developments with the WIS (WMO Information System):

Quarterly MQCS checked GCC data
as well as the original raw files from 1994 onwards are available at

http://gisc.dwd.de/GISC_DWD/toSimpleSearch.do.

The GCC as DCPC are testing their functions under the German GISC

Work in Progress: Data Access



Future…..

2011

Advances with HQCS,
Development of a new DM transfer format
- meeting modern user requirements,
Data storage solutions

2012

Data Access through WIS
Starting alignment of data flow structure with other JCOMM data types?.....

2013

MCDS website

Products?……

Questions and answers