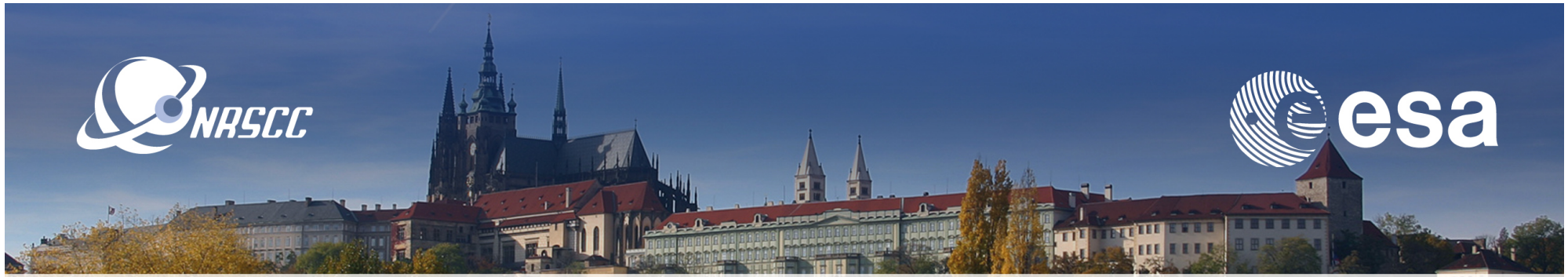


ESA - MOST Dragon 2 Programme

2011 DRAGON 2 SYMPOSIUM

中国科技部-欧洲空间局合作 "龙计划"二期

"龙计划"二期2011年学术研讨会

DRAGON in support of harmonizing European and Chinese marine monitoring for **E**nvironment and **S**ecurity **S**ystem – **DRAGONESS**

Project Coordinators:
Prof Johnny A. Johannessen and Prof Ming-Xia He

Presented by Knut-Frode Dagestad

DRAGONESS

- Consortium from Dragon
- EU FP6 Specific Support Action
  September 2007 – September 2010
- Intensive work on proposal at Dragon Workshop in Santorini June 2005

- Coordinators:
  - Johnny Johannessen (NERSC)
  - Professor Ming-Xia He (ORSI/OUC)

- European partners
  - NERSC, Norway
  - GKSS, Germany
  - ORS, Germany
  - IFREMER, France
  - CLS, France

- Chinese partners
  - Ocean Remote Sensing Institute, Ocean University of China
  - Institute of Atmospheric Physics, Chinese Academy of Sciences
  - Nansen-Zhu Center, China
  - National Satellite Ocean Application Service, China
  - Beijing Normal University, China
  - Ministry of Science and Technology, China
  - National Marine Environmental Forecasting Center, China
  - Second Institute of Oceanography, China State Oceanic Administration

Primary objective

- *to make an inventory of Chinese and European capacities of marine monitoring for environment and security including Earth observation data,*

  ….

  in order to harmonize methods in the frame of international programs such as GOOS and GMES and investigate the potential for establishing and harmonizing operational services contribution to GEOSS.

specific objectives:

- to assess current Chinese and European services and information products arising from integrated use of networks of remote-sensing, in-situ observations, models and data assimilation methods against the GEOSS requirements;
- to identify service/data gaps and barriers, such as for instance restrictive data dissemination and availability and re-use policies;
- to study and identify the potential for existing and foreseen European GMES services (both funded through EU FP6 and ESA) to be transferred to P.R. of China and provide the building blocks for the EU contribution to the Chinese marine monitoring for environment and security, and hence to GEOSS;
- to stimulate exchange and initiation of new partnership in Earth Observation science and technology in support to global environmental monitoring by bringing together scientists from Europe and China.

The GMES diamond

WP 4 SERVICES

WP 1 IN-SITU SYSTEMS

DRAGONESS

SPACE SYSTEMS WP 2

WP 3 DATA INTEGRATION & INFORMATION MANAGEMENT

Work packages

WP 1 – Review and utilization of in-situ observing system

WP 2 – Review and utilization of spaceborne observing system

WP 3 – Level of data integration and information management

WP 4 – Ocean and coastal information products and services

WP 5 – Capacity building in view of eventual gaps

WP 1 – Review and utilization of in-situ observing system

Question:

How are routine measurements from in situ sensors combined and used together with model-based forecasting systems?

Outcome:

Recommendations for what needs to be established if an operational ocean forecasting system shall be compliant with Chinese and GEOSS requirements

WP 1 – Review and utilization of in-situ observing system

- **Argo, VOS and Ferry-boxes:**
  - Is the routine use in Chinese coastal and shelf seas satisfactory?
- **Rapid data transmission:**
  - Are integrated data network systems established for rapid transmission of very high rates of raw data to processing centres?
- **Sea Level:**
  - Coastal and buoy stations measuring sea level maintained throughout Chinese coastal waters?

WP 1 – Review and utilization of in-situ observing system

- **Observatories:**
  - Development and operation of integrated observatories along the Chinese coastal and regional seas.
- **HF radars:**
  - What is the status?
- **Biogeochemical sensor development:**
  - Routine measurements of pigments, nutrients etc at fine spatial and temporal resolution?
- **River discharges:**
  - Is there routine monitoring system of river discharges (volume and nutrients) into coastal seas?

WP 2 – Review and utilization of spaceborne observing system

Question:

How are routine measurements from **spaceborne** sensors combined and used together with model-based forecasting systems?

Outcome:

Recommendations for what needs to be established if an operational ocean forecasting system shall be compliant with Chinese and GEOSS requirements

WP 2 – Review and utilization of spaceborne observing system

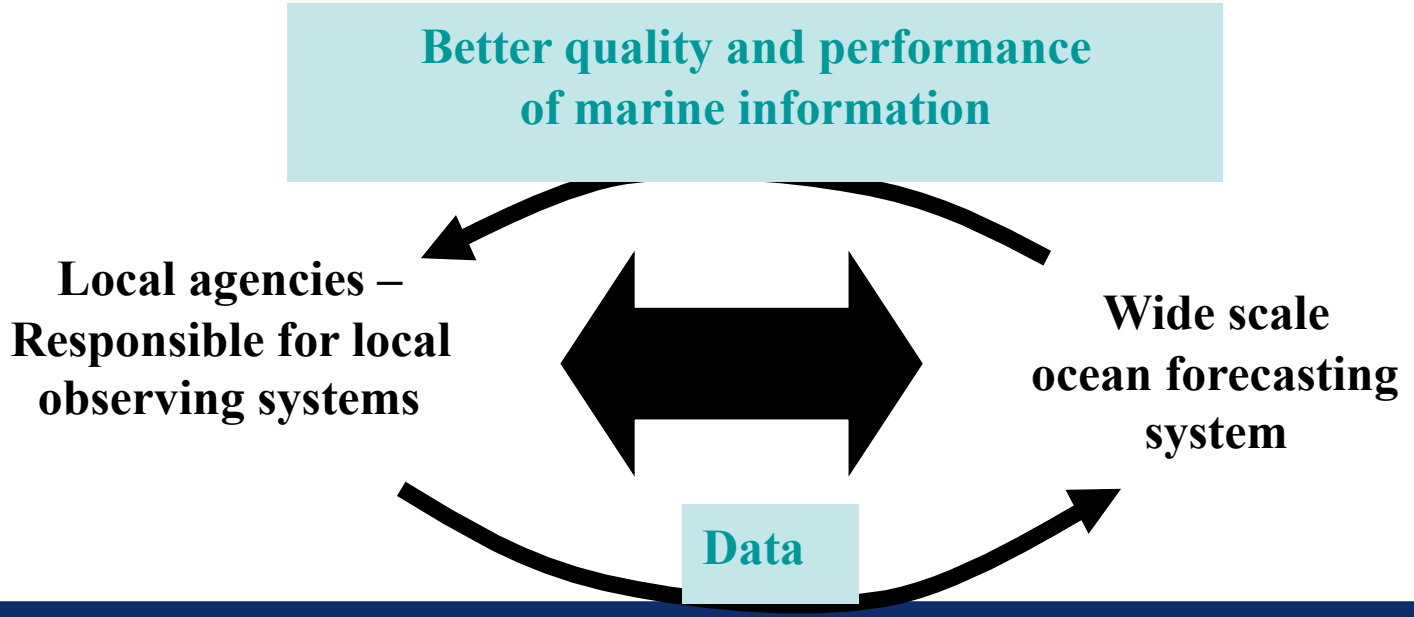
- **3 altimeters beyond 2007**
- **At least 3 infrared radiometers beyond 2007**
- **3 ocean colour spectrometers beyond 2007**
- **2-3 SARs to about 2007**
- **At least 2 scatterometers to beyond 2010**

- Are these systems routinely used?
- Are they combined with models?

WP 3 – Level of data integration and information management

Assessment of non-technical issues which may be critical for the successful establishment of a Chinese ocean forecasting system

The challenge is how to create an integrated system



WP 3 – Level of data integration and information management

- **Data Policy:**
  - Observational data and forecasting system outputs freely available for the public
- **Pre-processing of data for input to ocean forecasting systems:**
  - Dialogue between satellite data providers and modellers
  - E.g. merging data from different sources to optimise input to operational ocean models.

WP 4 – Ocean and coastal information products and services

- **Skill Assessment**
  - Systematic examination of the performance of forecasting models.
  - How do the performance depend on the quality of measured ocean data from satellites and in-situ systems?
- **Downscaling**
  - Regional forecasting systems improve with reliable information on the open boundaries from global and basin scale systems.

WP 4 – Ocean and coastal information products and services

- **Marine GMES**
  - Provision of high quality and accurate 3D current field for
    - oil spill and pollution monitoring
    - search and rescue applications
    - boundary conditions for coastal models and their applications
- **Coastal Models**
  - Not adequate resolution for applications to pollution monitoring from offshore installations, ships land sources.
  - Information flow from global and regional scale systems to the local coastal models must be unified and quality controlled.

WP 5 – Capacity building in view of gaps and eventual European capabilities

- **Merging of European and Chinese expertise on operational oceanography**

Project results / recommendations

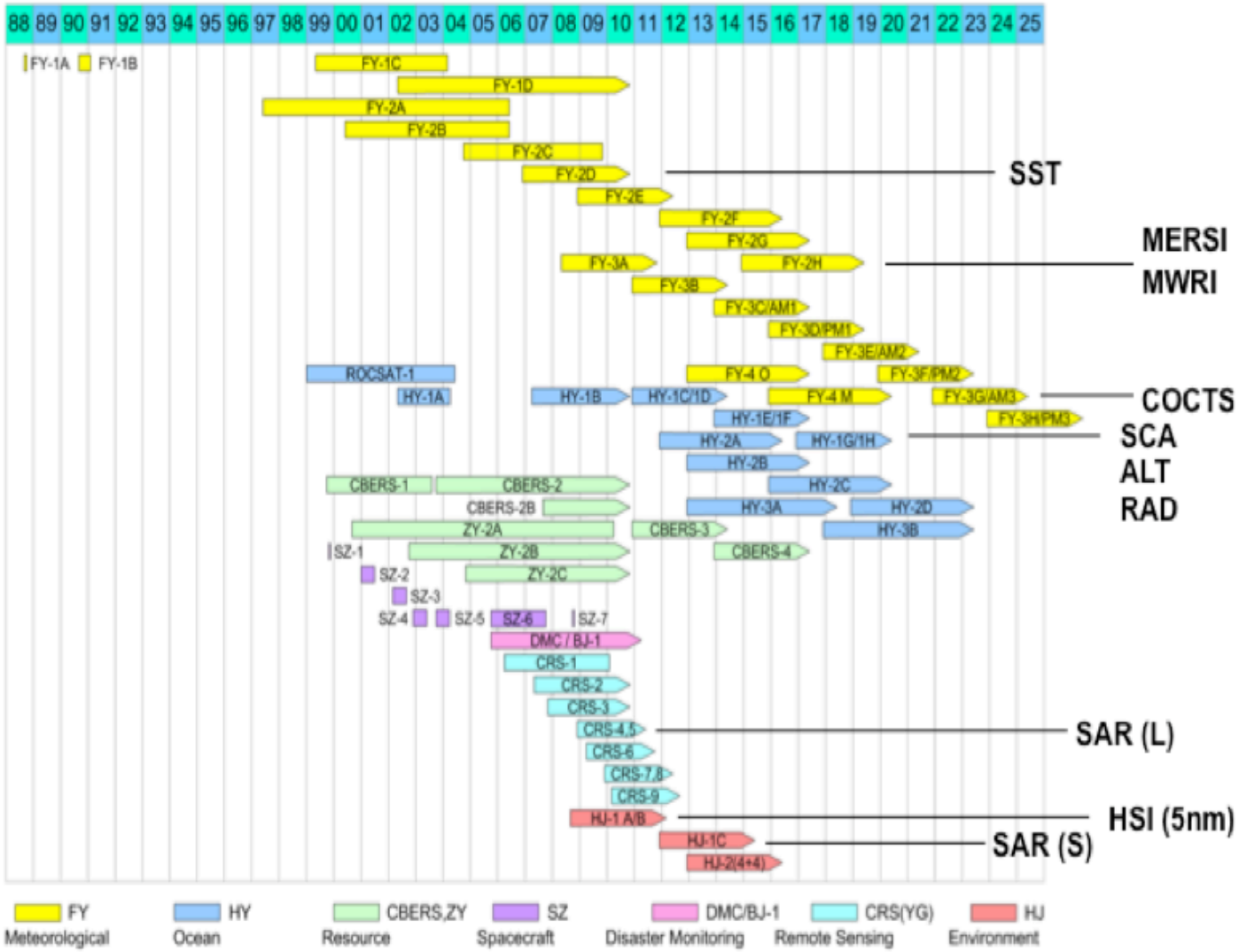
- Detailed reports on each WP available from project website: http://dragoness.nersc.no

- Overview given in Executive Summary Report

- With the exception of access to glider platforms and observations, the in situ observing capabilities in China for coastal oceans, shelf seas and the open ocean are comparable to Europe.

- The Chinese Ministry of Science and Technology should support the continuity and sustainability of the China Argo program including management, data quality control, and open and free data sharing.

- Like Europe, with its GMES system, China is currently working to put in place its own very impressive integrated Earth observation (EO) system. Since 1990, it has put 30 EO satellites into orbit, and it plans to bolster this array, by 2020, with a further 12 HY-n satellites, 5 FY-n series meteorological satellites and 12 disaster monitoring satellites.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DMC / BJ-1
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CRS-2
CRS-3
CRS-4,5
CRS-6
CRS-7,8
CRS-9
HJ-1 A/B
HJ-1C
HJ-2(4+4)
SST
MERSI
MWRI
COCTS
SCA
ALT
RAD
SAR (L)
HSI (5nm)
SAR (S)
FY Meteorological
HY Ocean
CBERS,ZY Resource
SZ Spacecraft
DMC/BJ-1 Disaster Monitoring
CRS(YG) Remote Sensing
HJ Environment

- While data from Chinese platforms and sensors are mostly available for research and development, restrictions still apply for near-real-time access. This is in clear contrast to the current evolution in Europe towards open and free data access.
- Example: MyOcean

  http://www.myocean.eu

- Although China has achieved good results in many ocean data assimilation experiments, it should improve its work in operational assimilation through enhancing the level of near-real-time data distribution and sharing in order to bridge the gap with Europe.

- The use of web servers for the dissemination of information and services in China is gradually becoming more common, but for the most part only graphical information is available for downloading

Conclusion

- Summary of DRAGONESS project
  - EU FP6 Specific Support Action
  - September 2007 – September 2010

- More information available from project website: http://dragoness.nersc.no