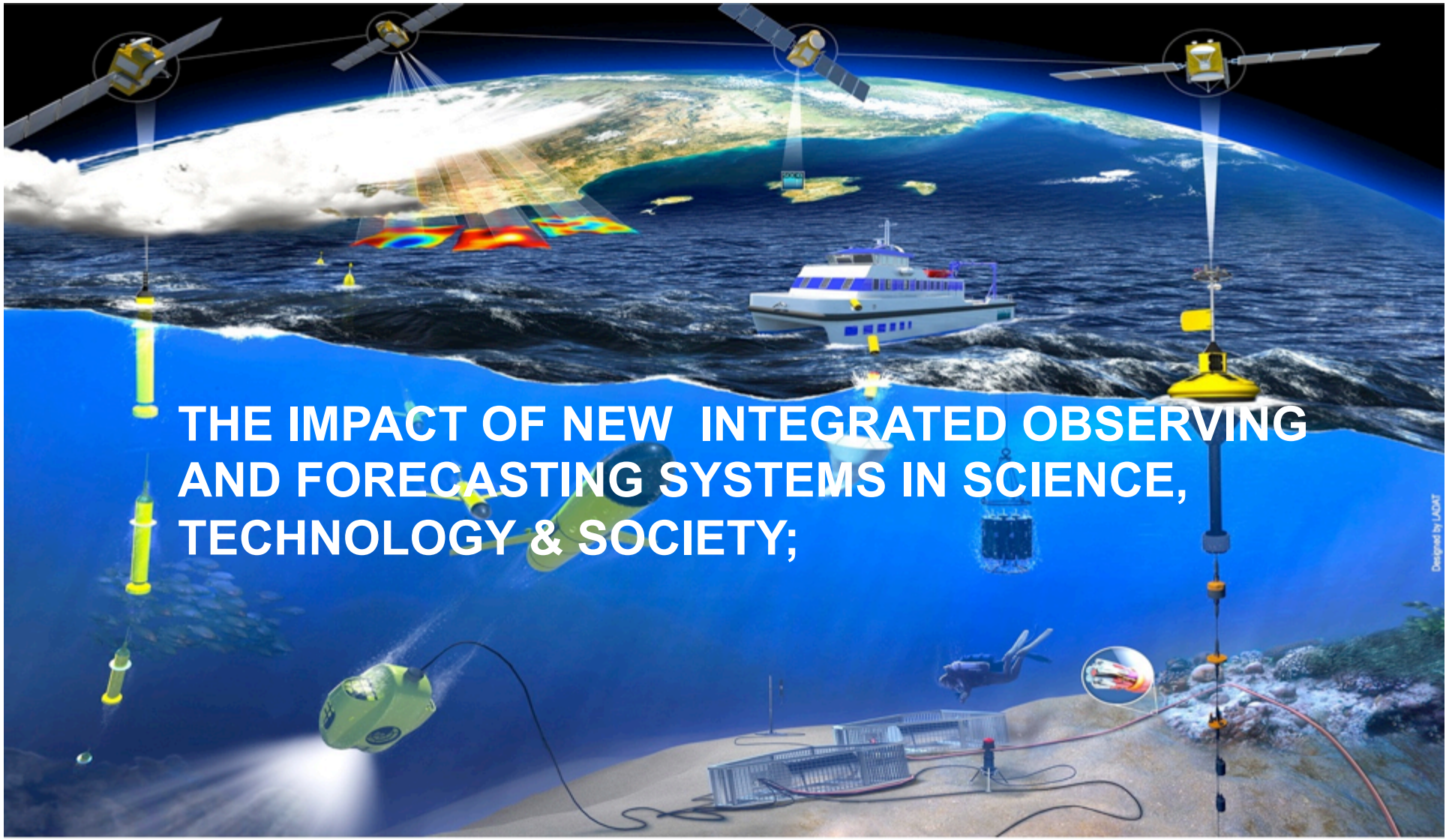

Why Ocean Observatories, why SOCIB?

New technologies NOW allow two paradigm changes on ocean observation:

Our Goal: … To characterize Ocean state, variability & ecosystem response

The Oceans; a complex system, changing, under-sampled

- Walter Munk-2001- "*The last century of oceanography is marked by the degree of under-sampling*",

- Carl Wunsh 2010: "*We need data, … models are becoming untestable*"

An Example: AMOC, Atlantic Ocean Meridional Circulation seasonal biases, …

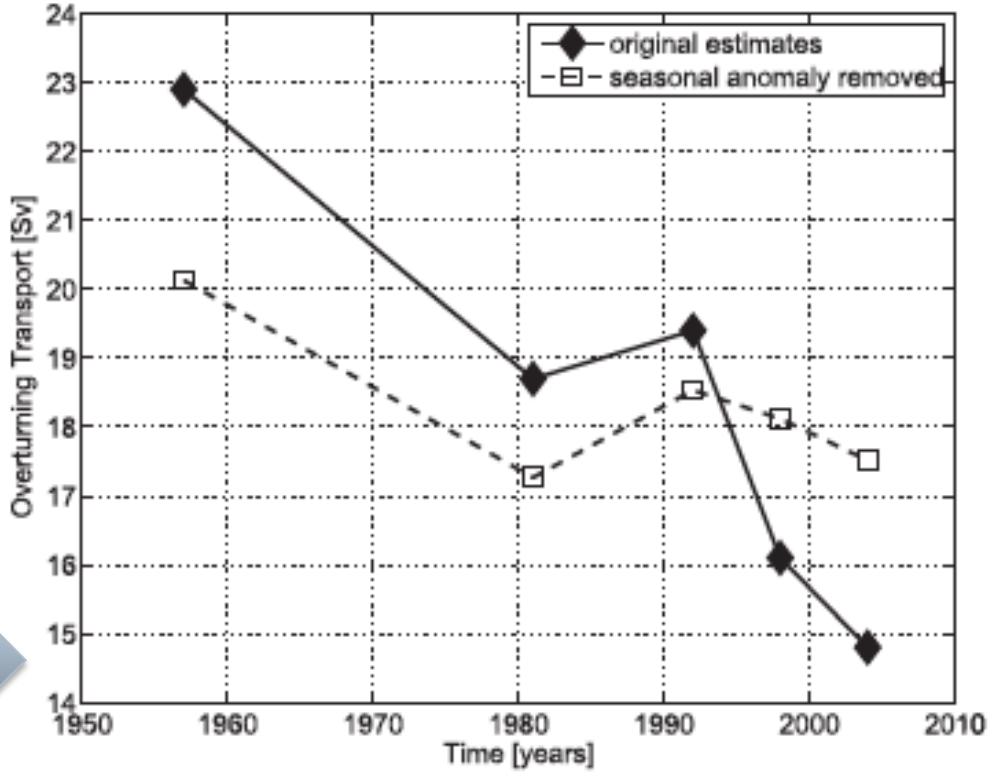

FIG. 16. The Ψ^{MAX} inferred from five hydrographic snapshot estimates between 1957 and 2004 (solid diamonds), as reproduced from Bryden et al. (2005b). The hydrography cruises were carried out in different seasons, namely, in October 1957, August–September 1982, July–August 1991, February 1998, and April 2004. The open squares represent the historical estimates of Ψ^{MAX} with seasonal anomalies of T_{UMO} (Fig. 10c; Table 2) subtracted.

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Changing Ocean Circulation

PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A

Phil. Trans. R. Soc. A (2012) **370**, 5461–5479
doi:10.1098/rsta.2012.0397

Changing currents: a strategy for understanding and predicting the changing ocean circulation

By Harry L. Bryden[1,*], Carol Robinson[2] and Gwyn Griffiths[3]

[1] *Ocean and Earth Science, National Oceanography Centre Southampton, University of Southampton, European Way, Southampton SO14 3ZH, UK*
[2] *School of Environmental Sciences, University of East Anglia, Norwich Research Park, Norwich NR4 7TJ, UK*
[3] *National Oceanography Centre, University of Southampton Waterfront Campus, European Way, Southampton SO14 3ZH, UK*

Within the context of UK marine science, we project a strategy for ocean circulation research over the next 20 years. We recommend a focus on three types of research: (i) sustained observations of the varying and evolving ocean circulation, (ii) careful analysis and interpretation of the observed climate changes for comparison with climate model projections, and (iii) the design and execution of focused field experiments to understand ocean processes that are not resolved in coupled climate models so as to be able to embed these processes realistically in the models. Within UK-sustained observations,

Marine research in the past 20 years has focused on defining the present day ocean circulation. From these measurements of ocean circulation, we begin to understand how biogeochemical distributions are set and how the ocean and atmosphere interact to determine the present climate [4].

The key issue for the next 20 years is to understand how the ocean circulation varies on inter-annual to decadal time scales

In April 2009, the array recorded a 30% drop in average current strength that persisted for a year, reducing the amount of heat transported to the North Atlantic

IN FOCUS NEWS

OCEANOGRAPHY

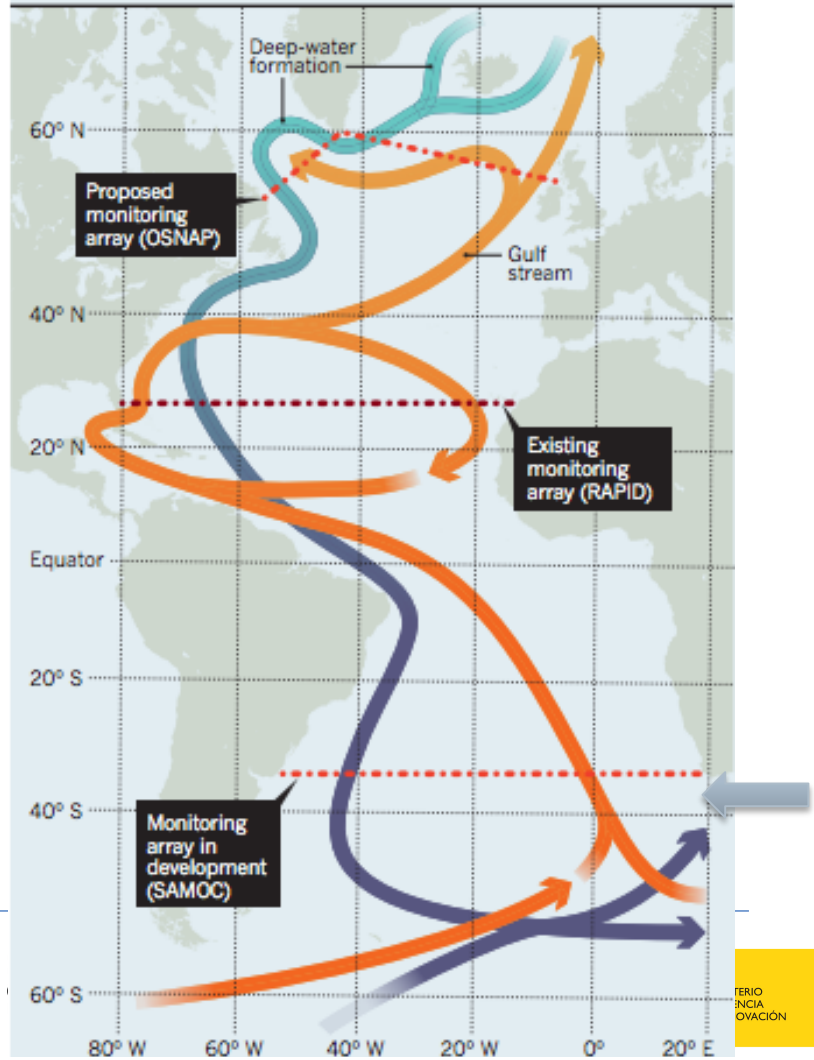
Oceans under surveillance

Three projects seek to track changes in Atlantic overturning circulation currents.

BY QUIRIN SCHIERMEIER

In April 2009, the array recorded[2] a 30% drop in average current strength that persisted for a year, reducing the amount of heat transported to the North Atlantic in which surface

a crucial component of the conveyor belt: the



OBSERVING FACILITIES

Research vessel

HF Radar

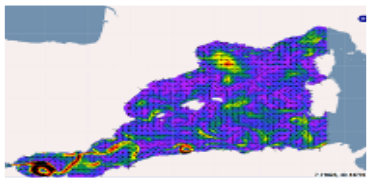
Gliders

Lagrangian platforms

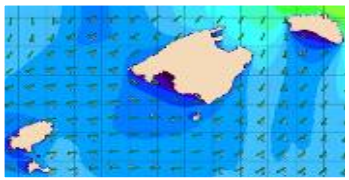
Fixed stations

Beach Monitoring

MODELLING FACILITY



Currents (ROMS)



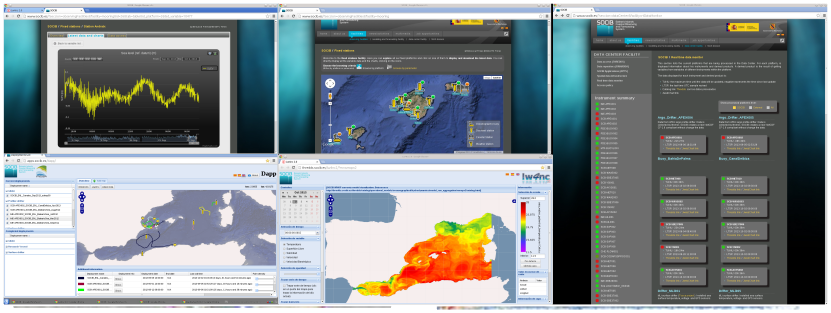
Waves (SWAN)

STRATEGIC ISSUES & APPLICATIONS FOR SOCIETY

Integrated Coastal Management

Marine Spatial Planning

DATA CENTER



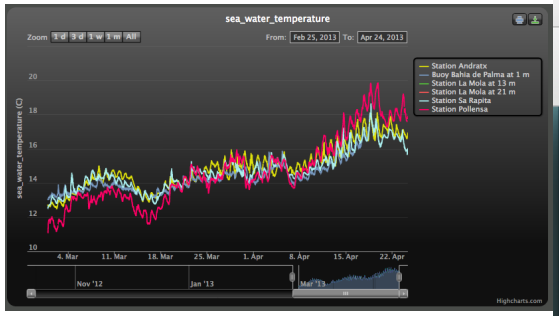
Data access – Data Repository – Applications
Spatial data infrastructure – Real time monitor

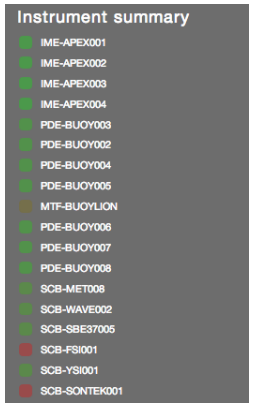
SOCIB Data Centre:

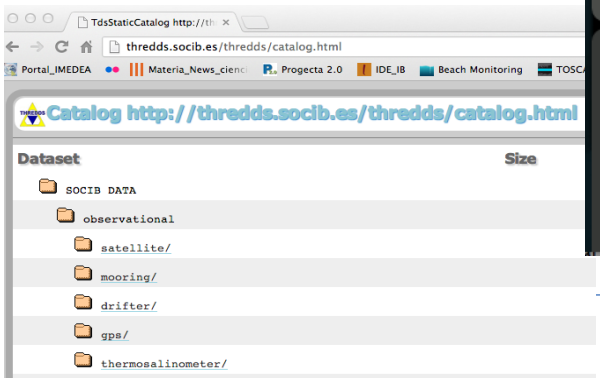
Real Time, Free Access & Download, Quality Controlled Data

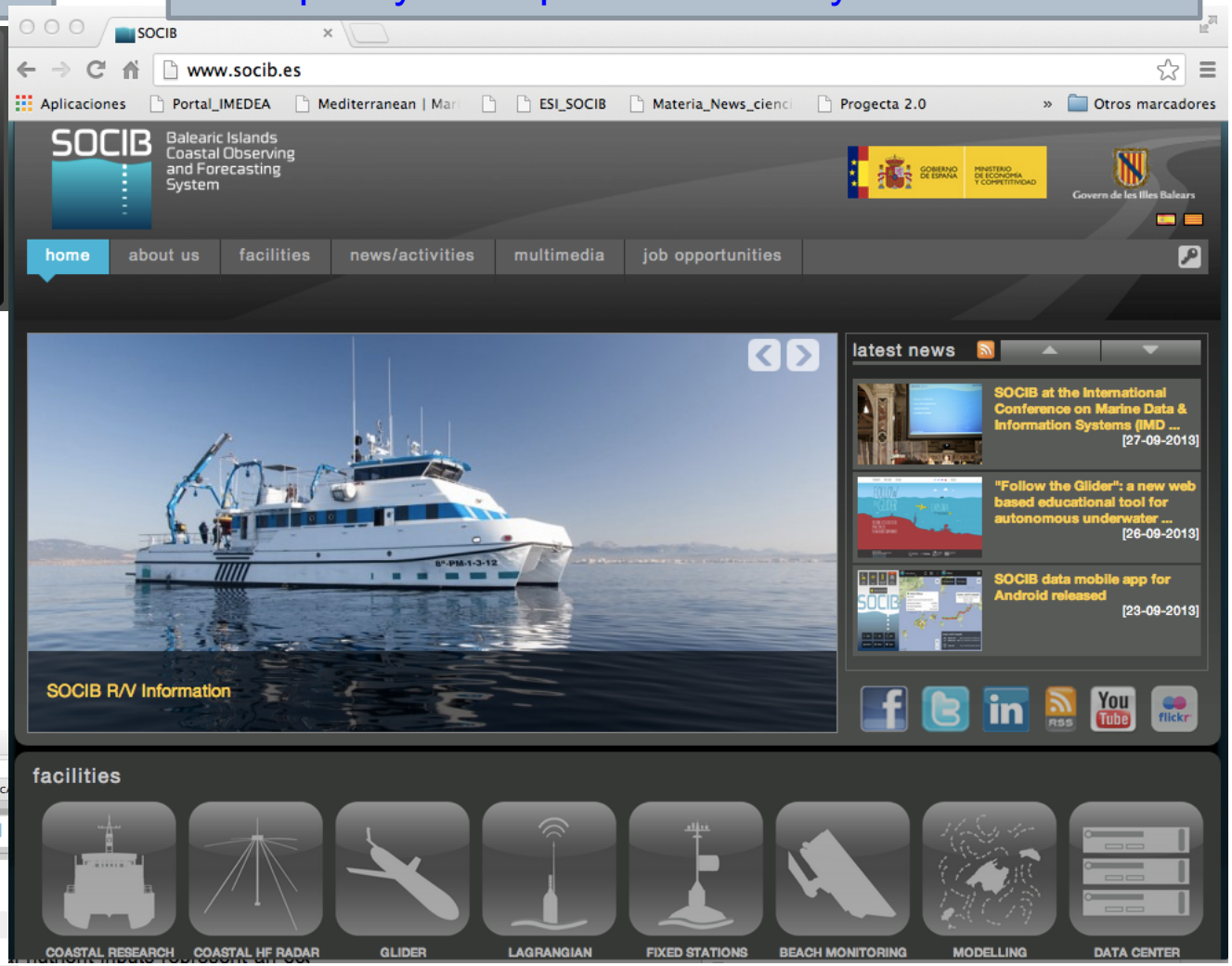
SOCIB:

- Scientific peer reviewed contributions
- Technology development and
- Capacity to respond to society needs









Govern de les Illes Balears

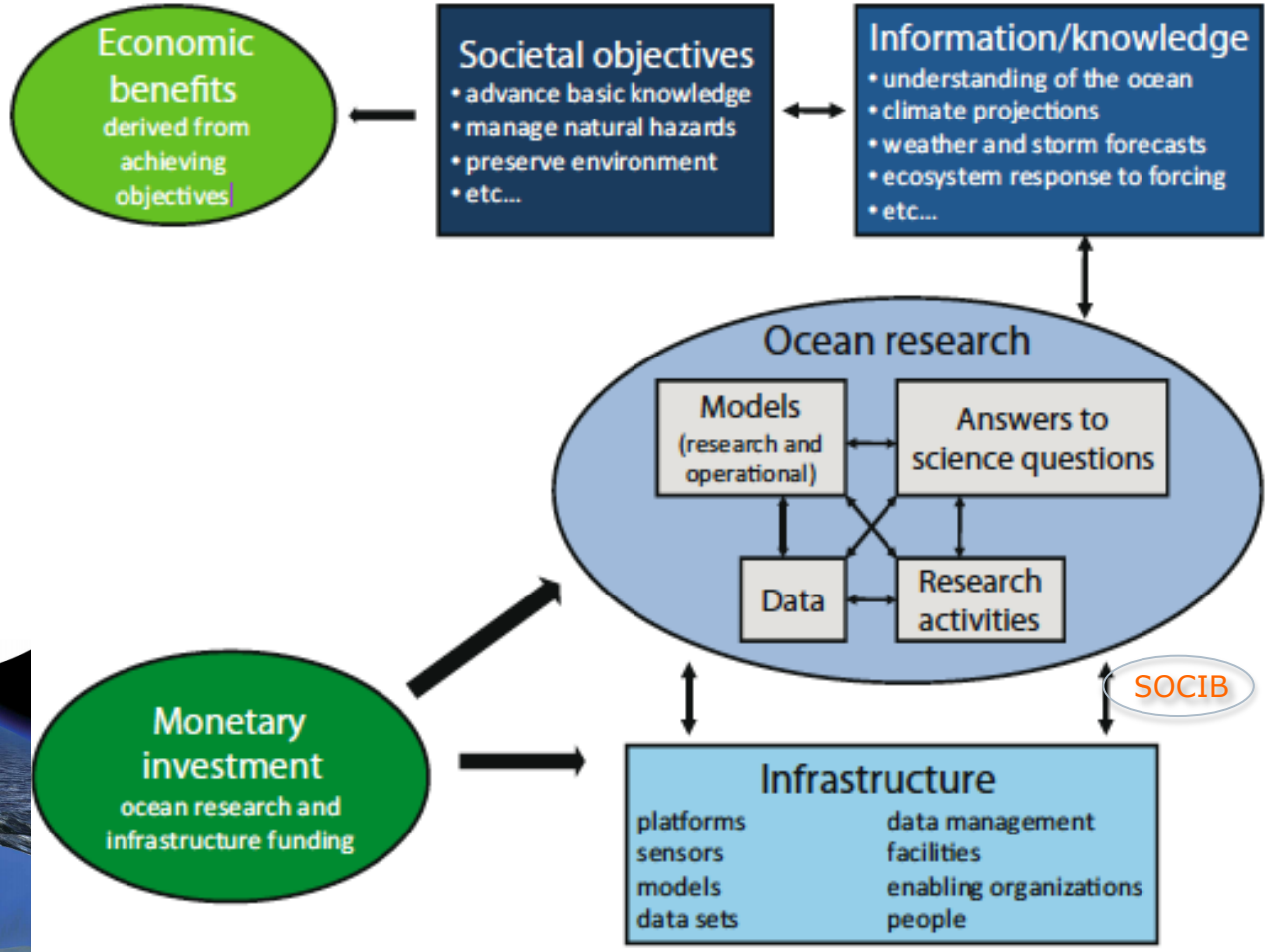
Glider Educational Tool
http://followtheglider.com/en/

The role of Marine Research Infrastructures in Europe; towards 2020, Blue Growth, …

SOCIB 3 **drivers & singularities**:

- **Science,**
- **Technology**
- **Society needs**

Strong international Partnership



Committee on an Ocean Infrastructure: Strategy for U.S. Ocean Research in 2030. NRC, 2011

THE REAL CHALLENGE FOR NEXT DECADE…

To use and integrate these new technologies…
to carefully and systematically:

- ☞ Monitor the variability at small scales, e.g. mesoscale/weeks, to…
- ☞ Resolve the sub-basin/seasonal and inter-annual variability, and, by this…
- ☞ Establish the decadal variability, understand the associated biases and correct them … (as recently shown in…)

(Nature, May 2013)

SOCIB scientific contributions, technology developments and society driven results can be found at Tintoré et al., (2013). Marine Tech. Soc. J., Vol. 47. N. 1. pp. 101-117. http://dx.doi.org/10.4031/MTSJ.47.1.10)