



Earth Observation for Marine Environment

International trends & developments

How to promote earth observation
applications?

How to get funding?

Capacity building



0. Introduction

Mark Noort, consultant, project manager

HCP international:
consulting, marketing of earth observation

Coordinator GEONetCab:
project for promotion & capacity building of
earth observation applications



Earth observation applications

- On the verge of reaching new user communities
- These new user communities need to be involved
- Weakest link / last mile aspects are important
- Marketing needed: promotion & capacity building



Life cycle of products & services

Initialization

System analysis & design

Rapid prototyping

System development

Implementation

Post-implementation





Assessment of business & funding opportunities

- Categories of environmental products & services
- Life cycle phase of product or service
- Regional context, level of technological & economic development
- Optimum marketing mix



1. International trends & developments in marine environment

Trends

More attention for:

- (sustainable) fisheries management
- management of extreme events (flooding, safety, pollution)
- management of marine ecosystems
- effects of climate change
- more effective and efficient exploitation of resources (oil, wind, tidal, etc.)
- community participation and public awareness



Ecosystems Approach

- Reduce resource use and emission of greenhouse gases;
- Minimizing waste;
- Improving governance.

State of fisheries and aquaculture (FAO)

Goals

Ensure that:

- More food is produced sustainably;
- Demand for the most resource-intensive types of food is contained;
- Waste in all areas of the food system is minimized;
- The political and economic governance of the food system is improved.

State of fisheries and aquaculture (FAO)

Climate change

Implications:

- **Availability** of aquatic foods will vary;
- **Stability** of supply will be impacted;
- **Access** to aquatic food will be affected;
- **Utilization** of aquatic products will be impacted.

Climate change fisheries and aquaculture (FAO)

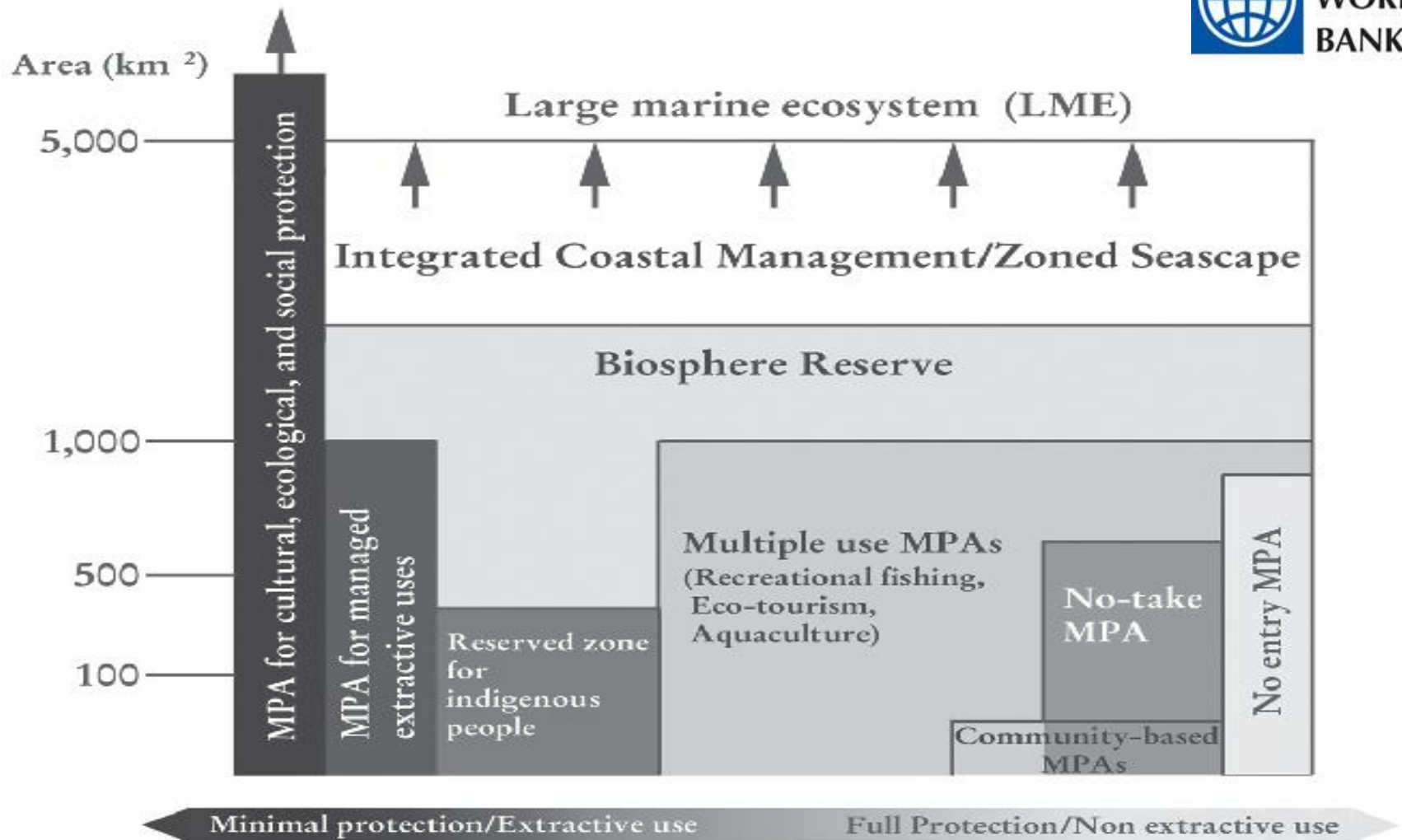
Climate change

Options for enabling change:

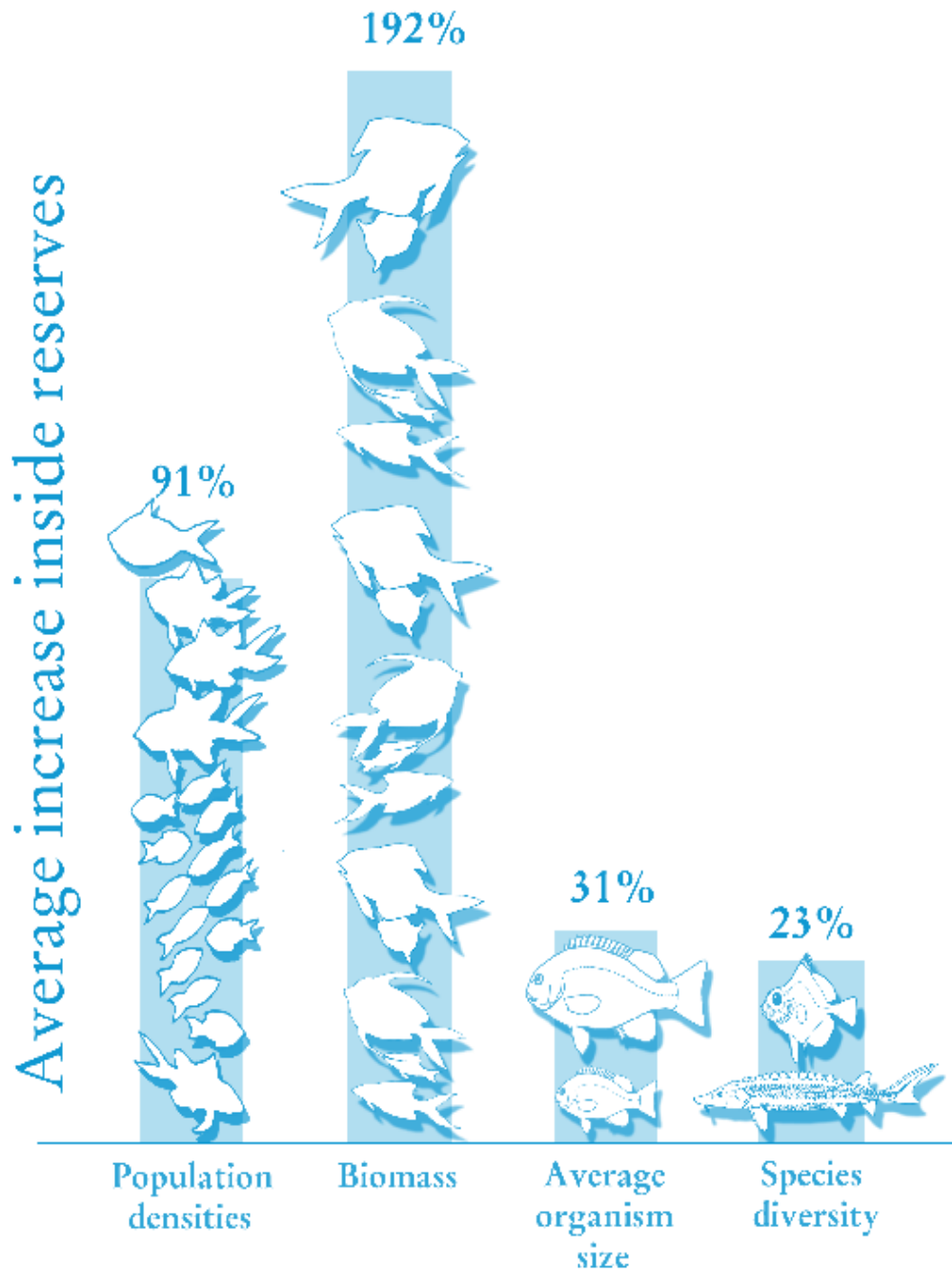
- Developing the knowledge base;
- Policy, legal and implementation frameworks;
- Capacity building: technical and organizational structures;
- Enabling financial mechanisms: embodying food security concerns in existing and new financial mechanisms.

Climate change fisheries and aquaculture (FAO)

Marine protected area classification scheme



Marine protected areas (FAO)



Results of protection measures inside reserves

Marine protected areas (FAO)

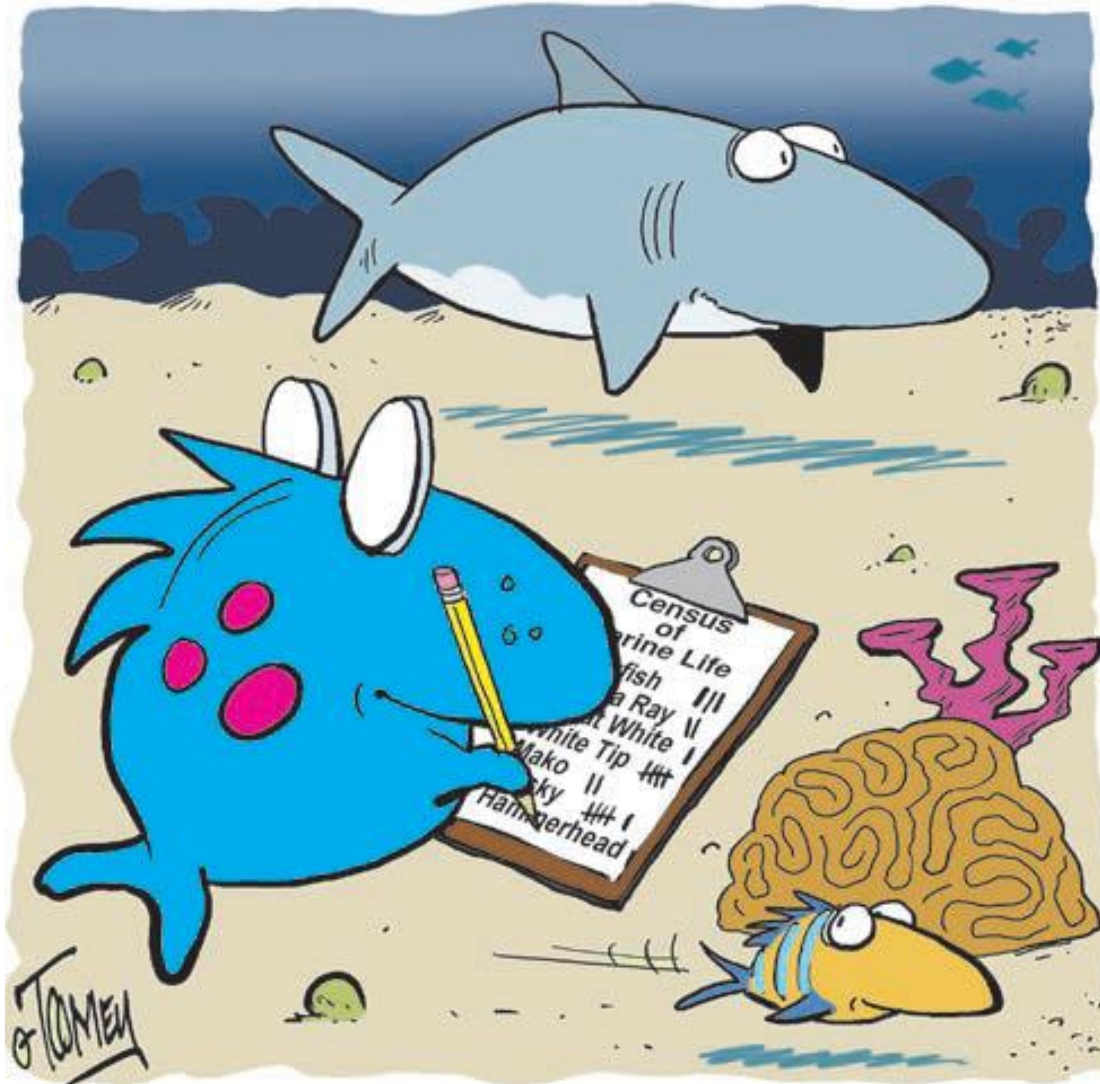
Marine protected areas

Goals:

- **Biological/ecological** (protection fishery resources, biological diversity, individual species, habitat, restoration degraded areas)
- **Social and economic** (fostering food security, improving livelihoods, non-monetary benefits, compatibility management & local cultures, enhancement awareness & knowledge)
- **Governance** (effective management & legal structures, stakeholder participation & representation, management plan compliance by resource users, management and reduction of resource–use conflicts)

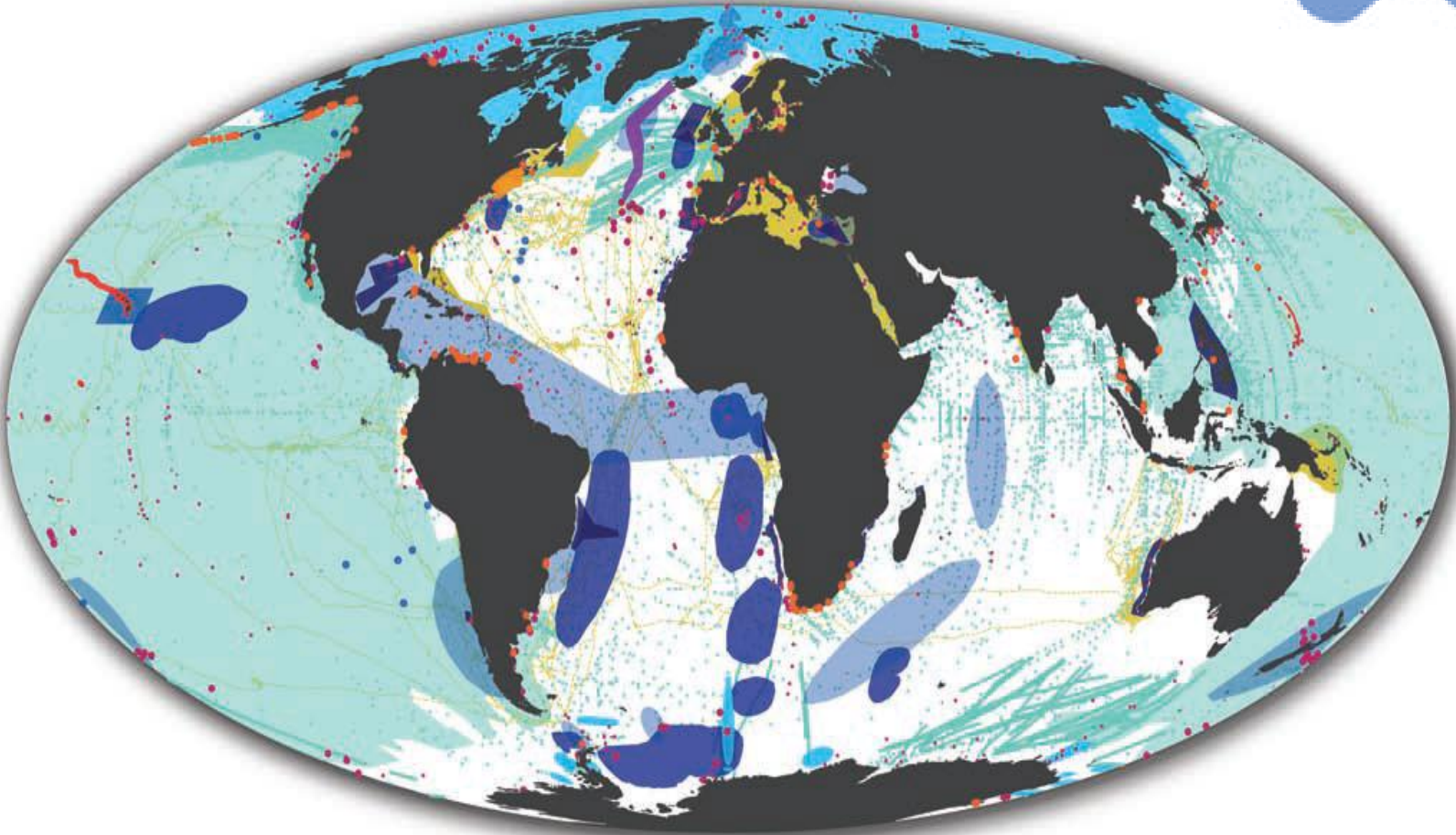
Census of Marine Life (highlights & summary)

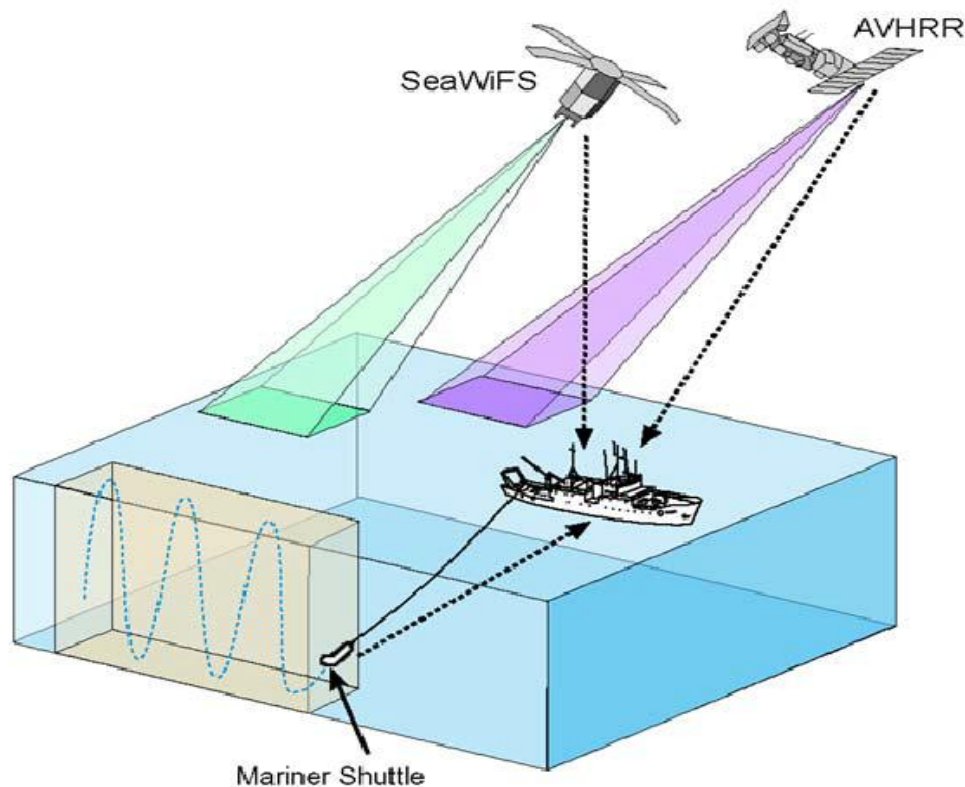
Overview of global inventory of marine life in the past decade



www.coml.org

Census of Marine Life – project areas



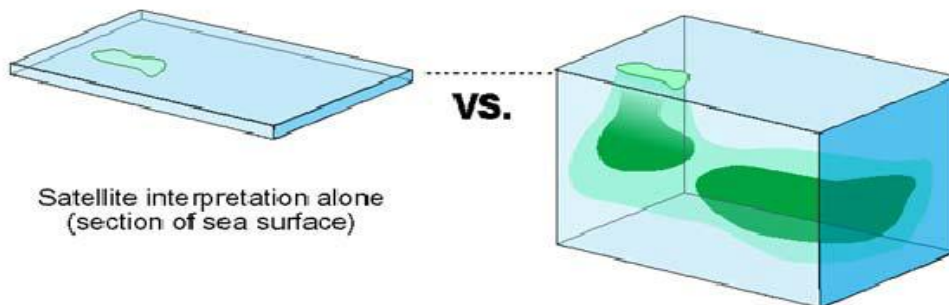


Large marine ecosystem concept (NOAA)

Combination of satellite and in-situ information



Satellite and in-situ information collected and integrated at sea



3-D Visualization of Primary Productivity produced from satellite and in-situ sensors

*Below surface:
ARGO programme*
www.argo.uscd.edu

More references:

Green economy in a blue world (UNEP) *Overview of options to combine economic development with sustainable management of the marine environment*

Technical guidelines on fisheries and aquaculture (FAO)

Marine protected areas (FAO) *Overall guidelines for management of marine protected areas in the context of fisheries, including a short description of GIS and remote sensing as support tools*

Fisheries management (FAO)
Case studies from Brazil, India, Palau and Senegal

More references (2):

Marine and coastal dimension of climate change in Europe

(EC) *Description of actual situation and expected effects of climate change for 'European' seas and coastal areas, including sections on GIS, remote sensing and SDI*

SAHFOS ecological status reports 2011, 2010, 2009, 2008

Overview of monitoring marine biodiversity by means of the continuous plankton recorder survey: trends for each of the world's oceans with respect to ecosystems and climate change

IGBP marine ecosystems and climate change

Overview of changes due to human intervention and/or climate change



2. Steps to promote earth observation for marine environment



State-of-the-art

Earth observation is new technology.

Learn technical skills, but when back in professional practice, it has to be put to good use.

That involves 'selling' it.

How to do that?

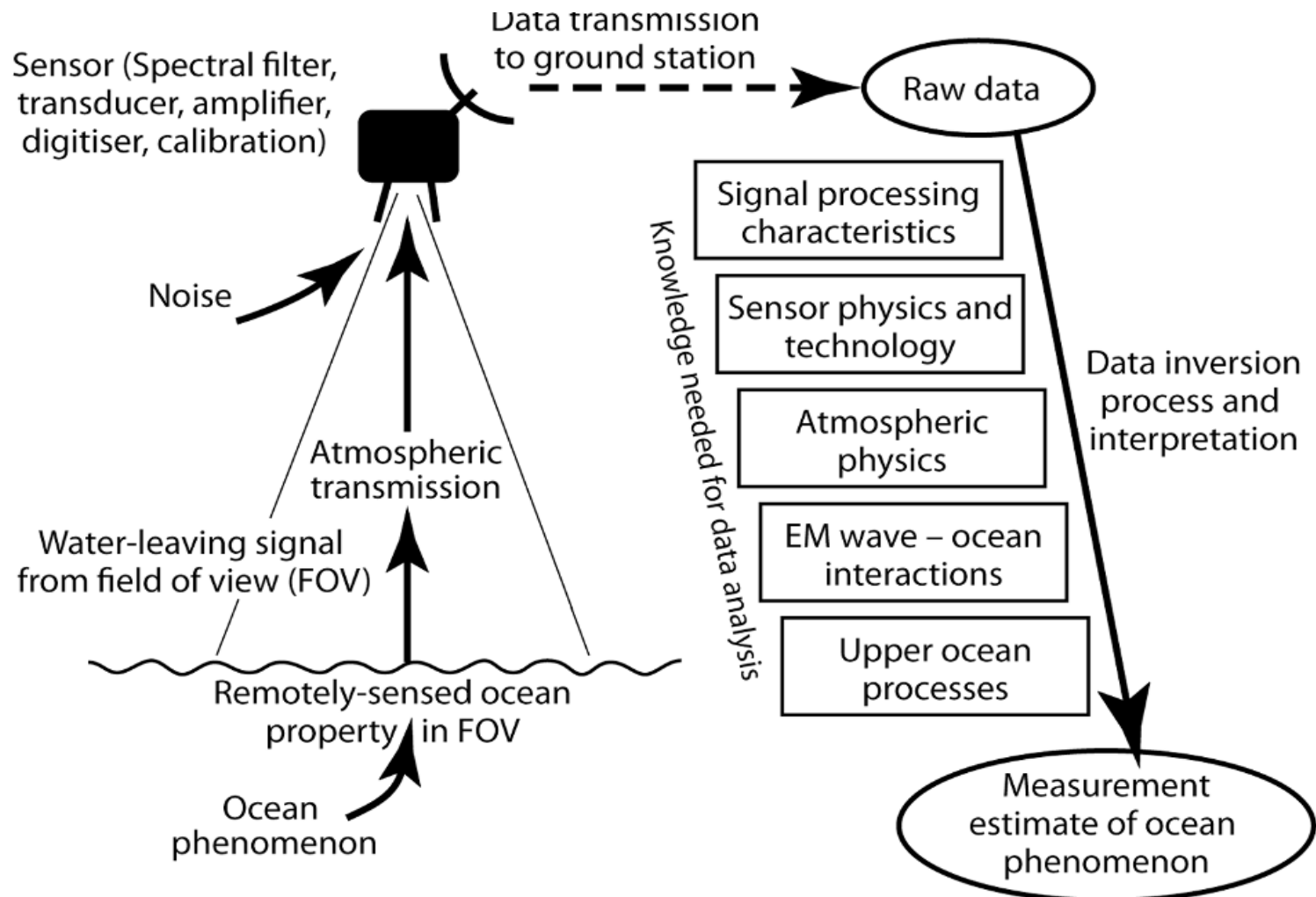
To whom? Could be your own boss, local authorities, communities, etc.

Categories of products and services

- **Ocean topography, temperature and currents**
- **Ocean colour**
- **Satellite-based fishing**
- **Marine and coastal ecosystems**
(see also environmental management toolkit)
- **Climate monitoring and modelling, mitigation of the effects of climate change** *(see also climate change toolkit)*
- **Marine and coastal safety and disaster management**
(see also disaster management toolkit)

Discovering the Ocean from space (Robinson):

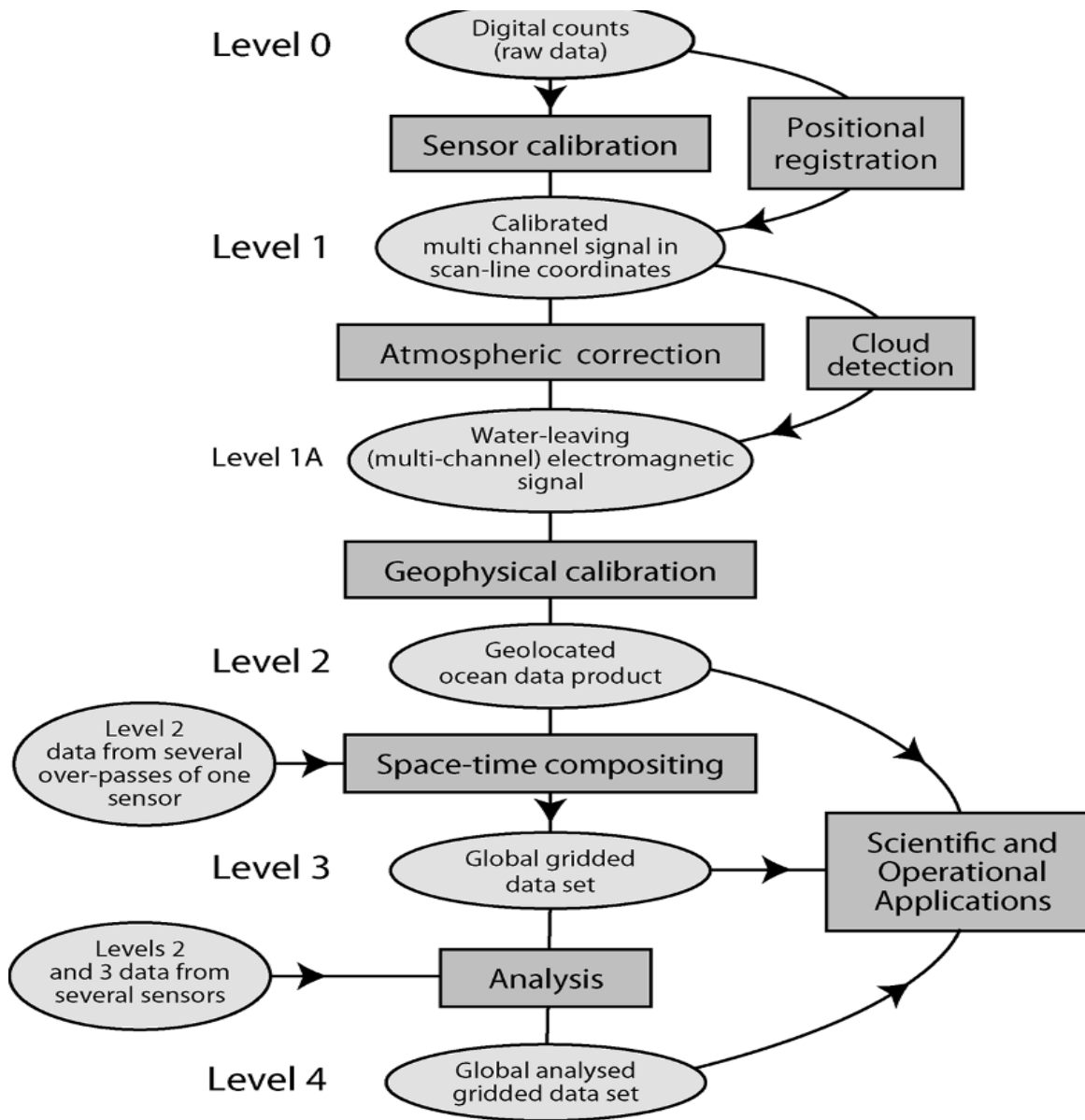
General overview



Discovering the Ocean from space

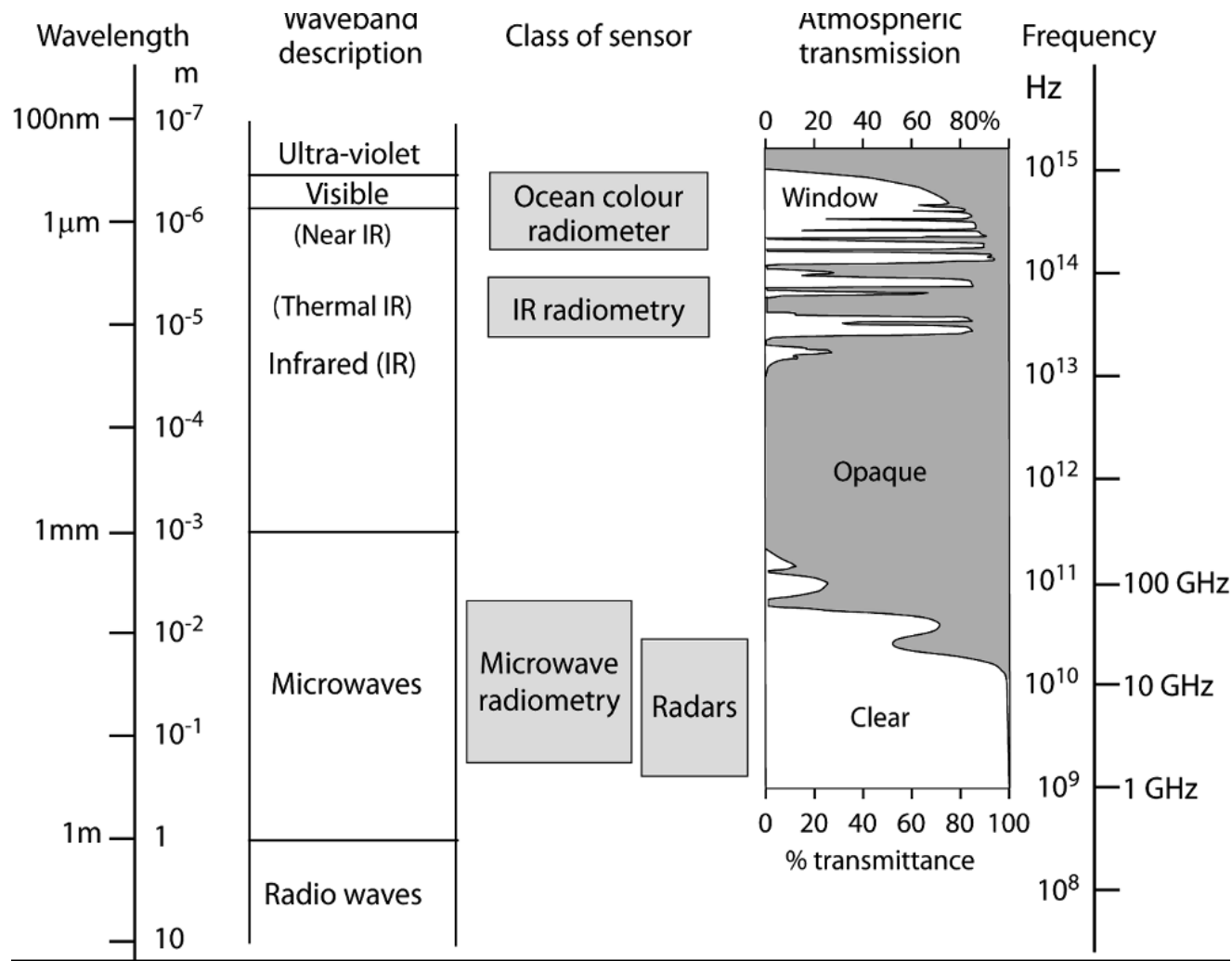
(Robinson):

Data processing tasks



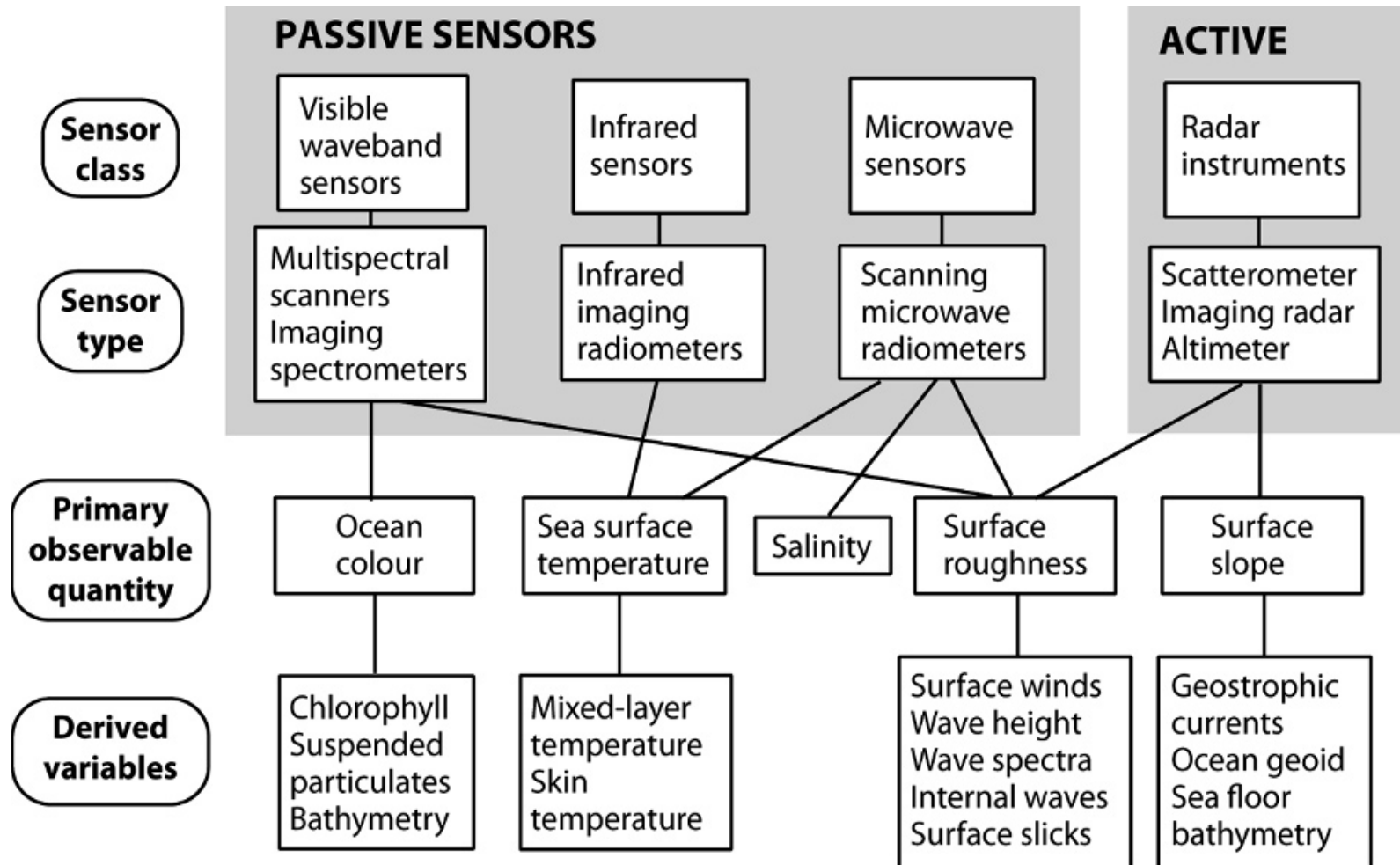
Discovering the Ocean from space (Robinson):

Electromagnetic spectrum



Discovering the Ocean from space (Robinson):

Classes of sensors



What can be measured and assessed?

- Sea surface height
- Sea surface temperature
- Ocean colour
- Wind vector
- Sea state (significant wave height)
- Sea state (directional wave spectra)
- Sea ice parameters

From: Discovering the Ocean from space (Robinson)

Observations

- **Altimeter:** sea level change, ocean circulation, ocean tides, ocean surface wind wave studies, El Niño studies, cyclone/hurricane studies, rainfall studies.
- **Scatterometer** (wind velocity and direction): weather forecasting, storm detection, ship routing, oil production.
- **Radiometers:** sea surface temperature, salinity, soil moisture, sea ice, precipitation, integrated water vapour, liquid water content of the atmosphere

From: Remote sensing applications – Oceans (NRSC)

Application areas

- Weather prediction, including extreme events and climate change studies modelling
- Ship route planning
- Maritime safety
- Satellite based fishery & sustainable fisheries management
- Ecosystem management
- Coastal zone management and solutions
- Energy
- Pollution tracking and mitigation

Characteristics and perspectives of Earth Observation

- Multiple inter-related phenomena
- Expert knowledge required (*in addition to automated data processing*)
- Application of complicated models
- Specialization needed
- Clients in off-shore energy and shipping capable of defining specifications and appreciating technicalities
- Ecosystem services more directed at government clients and general public
- Fisheries is intermediate case, depending on development level

Leads to: market dominated by government organizations and specialized companies, both as suppliers and clients

Example (1)

MyOcean www.myocean.eu

- Marine safety
- Marine resources
- Coastal & marine environment
- Weather & seasonal forecasting

GMES Marine Core Service

*Information and data for specialists and general public
Catalogue with products and databases available*

Example (2)

BMT ARGOSS www.bmtargoss.com

- High resolution weather forecasting
- Global wind & weather forecast services
- Near-shore modelling
- Persistence analysis: *determining the operational risks & workability*
- Ambient climate design criteria
- Oil spill information services
- Search and rescue information system
- Shipping applications (*maneuvering, performance*)

Example (3)

ASTRIUM maritime surveillance www.astrium.eads.net

(SpotImage)

- Space-based technologies for traffic control, smuggling, illegal fishing, oil dumping & pollution monitoring, illegal immigration, piracy, safety
- Three service levels: statistical, tactical & urgent
- Features:
 - situation awareness of the overall maritime domain
 - effectiveness from early warning to interception
 - optimised operation plan at sea



Example (4)

Sustainable Fisheries Management:

INCOIS marine fishery advisory services

www.incois.gov.in/Incois/marine_fisheries_main.jsp

Indian Ocean advisory service on fishery

SAFARI & ChloroGIN projects: now FARO

www.faro-project.org

Research on sustainable fisheries management

More references:

African marine atlas <http://omap.africanmarineatlas.org/index.htm>

Online atlas product on African marine resources, training courses and work programmes

Global ocean data assimilation experiment (GODAE)

Improved standardisation, modelling, forecasting and a cost-effective and sustainable ocean observing system

FUGRO ocean science & metocean *Company brochures with description of meteorological and oceanographic services*

Why ocean colour? The societal benefits of ocean colour technology *With chapter on ocean colour for fisheries, including management of endangered species*



Marketing of earth observation

Marketing of earth observation is difficult.

New technology, few big companies, lots of small ones.

Lots of reports describing the bottlenecks, like reliability, data access, data continuity, etc.

Means that relatively a lot of effort is needed to promote EO.

Points to keep in mind:

- Look for opportunities, where can you have most success in a short time: quick-wins.
- Target the right audience to start with: who would be interested and listen to you?
- Identify the problem that they are trying to solve: is it the same as yours?
- Learn to speak the same language. Example 'pelagic species': this is a term most politicians do not understand and do not care about. Use terms related to profits and losses.
- Look for examples from elsewhere (success stories): solutions that work and are affordable.



*Be patient:
introduction of new technology
and / or applications takes time*



3. How to get funding for your activities



Approach

- Share information on your subject (a thing you are doing) and think that is interesting for your contact, then look for the link. Could this solve a problem for your partner? Are adjustments necessary? Need other parties be involved? Take it from there.
- LEADS, LEADS, LEADS



How?

- Establish your network.
- Look for opportunities.
- Write a good proposal.
- Promise much, but not too much.



Proposal outline

(more detailed version in separate document, see also www.geonetcab.eu)

- | | |
|-----------------------------|--------------------|
| 1. Introduction / relevance | 6. Risk assessment |
| 2. Objective(s) | 7. Time schedule |
| 3. Activities | 8. Budget |
| 4. Output | Annexes |
| 5. Management & evaluation | |



THE REGIONAL ENVIRONMENTAL CENTER
for Central and Eastern Europe



Other references

- Civicus: writing a funding proposal
- Michigan State University: guide for writing a funding proposal
- ESRI: writing a competitive GRANT application
- REC: project proposal writing



Again:

- *SHARED PROBLEM*
- *SHARED LANGUAGE*
- *SHARED SOLUTION*

If all else fails, try to link with a more popular (and easy to understand) topic.



4. Capacity Building



General

Marketing is promotion + capacity building.

Especially for the introduction of new technologies capacity building is important at all levels.

Capacity building is the instrument to increase self-sufficiency and make solutions work.

Think of:

- Different instruments for different levels: workshops for decision makers and awareness raising, detailed technical training for professionals.
- Provide follow-up. Getting funding for good capacity building is difficult: everybody agrees that it is important, but nobody has time.
- Training is usually part of funding of big projects that are managed by big companies or ministries, as a consequence capacity building is forgotten (in the end).
- Aim at small budgets that are available without having to tender.

Examples & references

Handbook of satellite remote sensing image interpretation

www.iocg.org/handbook.html *Case studies on air/water quality, phytoplankton and macro algae, fisheries and aquaculture, marine ecosystem characterization + exercises*

www.pi-goos.org *Support to marine observing programmes, communication and capacity building in the Pacific*

IOC principles and strategy for capacity building

General framework for capacity building

GEONetCab capacity building web www.geonetcab.eu

Compilation of tutorials, references, open-source software, etc.

GEO Portal: www.earthobservations.org

More references

A Rough Google Earth Guide

**MEASURE Evaluation Global Positioning System Toolkit
(USAID)**

**Handbook of Research on Developments and Trends in
Wireless Sensor Networks: From Principle to Practice**



Further details:

Contact: Mark Noort

m.noort@hcpinternational.com

www.geonetcab.eu