

# CARIS MSDI Use Cases

Some examples of diverse projects

## SDI underpins what we do

- 34 years developing GIS software
- Specializing in Hydrography for 30+ years
  - Also cadastral, topographic and aeronautical
- CARIS embraces international standards
  - IHO S10x, ISO TC211, OGC, OGP SSDM
- Data centric and database driven
- Promoting non proprietary initiatives
  - OSCAR-js is our open source OGC map viewer API
  - CSAR plugins for GDAL, Python bindings
  - CARIS BDB utilizing PostGres/PostGIS or Oracle Spatial



# Summary of Use Cases

## • INSPIRE



- Royal Netherlands Navy
- UKHO MEDIN DAC



## • Organizational and Regional SDIs

- SHOM Infrageos-h
- IHO MACHC MEIP



## • Land and Sea Integration

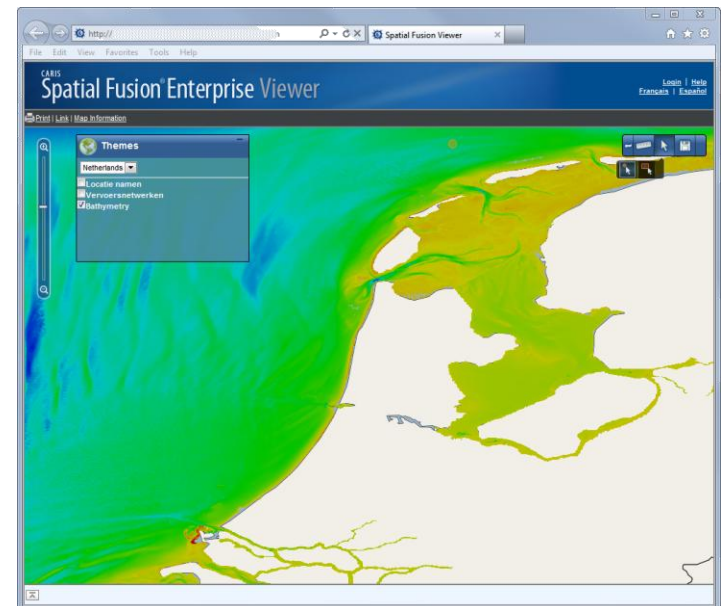
- Mozambique (Coast Map IO)
- Canada TUB





- INSPIRE service for responsible themes
- Efficient and cost-effective solution
  - Hosted by external service provider
  - Installed and maintained by CARIS
  - Data made live by CARIS
  - Service is easy extendable also with non INSPIRE services
- RNLN met their INSPIRE mandate
  - Service live in weeks after contract award

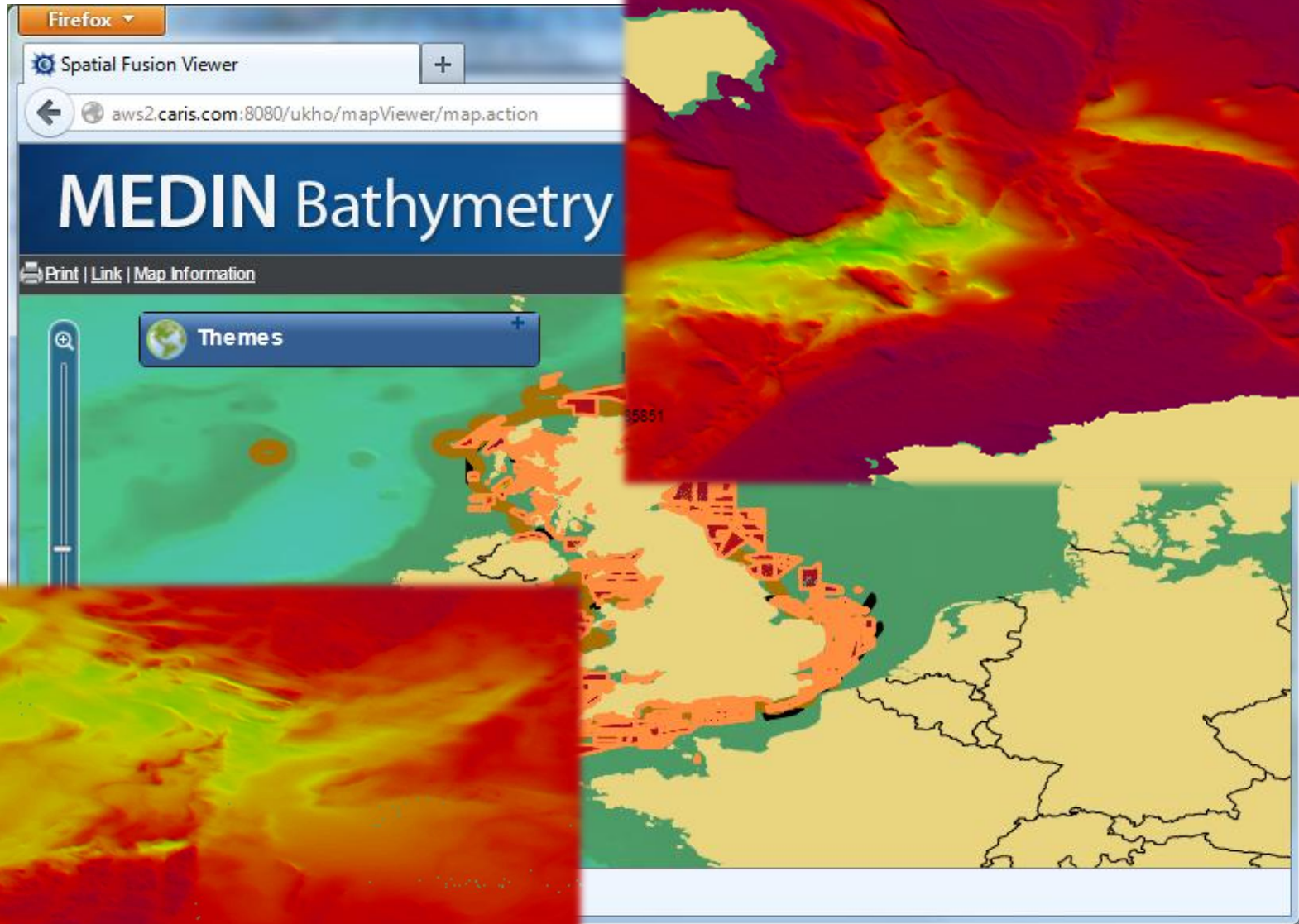
- Serviced using CARIS Spatial Fusion Enterprise
- Two INSPIRE Annex I themes
  - Geographical names
  - Transport networks
- One INSPIRE Annex II theme
  - Elevation
- Node in national INSPIRE
  - More possibilities e.g. WCS



- MEDIN aims to improve access to marine data
- Data Archive Centres
  - Network of centres
  - Provide long-term storage facilities
  - Provide access to data
  - For example:
    - BGS for geology
    - The Met Office for metocean
    - UKHO for bathymetry
- Central portal for metadata

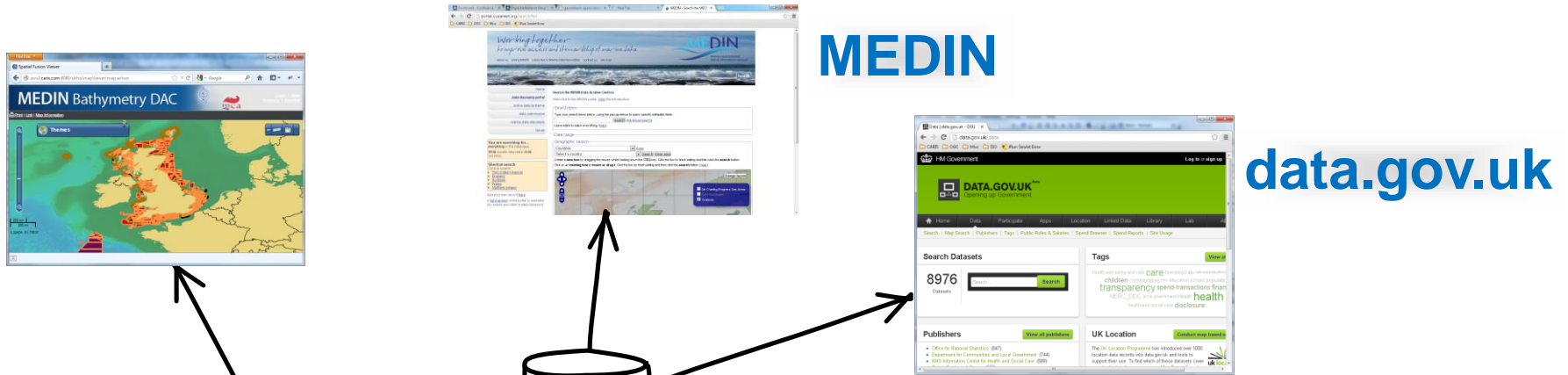
<http://www.oceannet.org>





- Bathymetry
  - From BDB via Spatial Fusion Enterprise
  - Stored in varying resolutions
  - Downloadable in varying resolutions
  - Cropped to user defined extents
- OGC services:
  - Web Map Tile Service – for browsing data
  - Web Coverage Service – for downloading bathymetry
  - Catalogue Service Web – for metadata





**MEDIN**

**data.gov.uk**

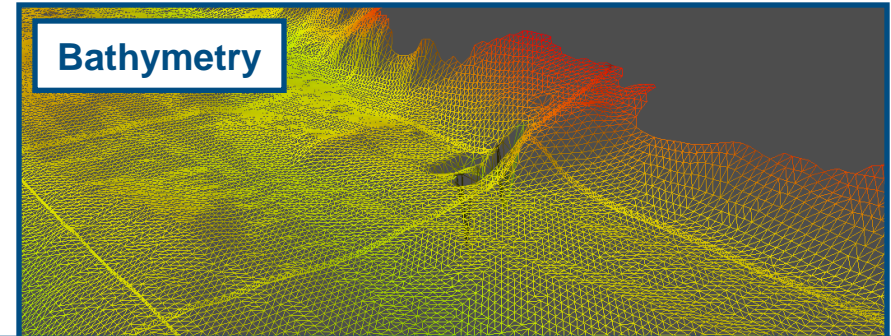
**UKHO DAC**

- **Metadata**
  - MEDIN portal
  - UK data.gov.uk portal
- **Bathymetry for download**
- **INSPIRE Services**
  - Traffic Separation Scheme
  - Legal Limits

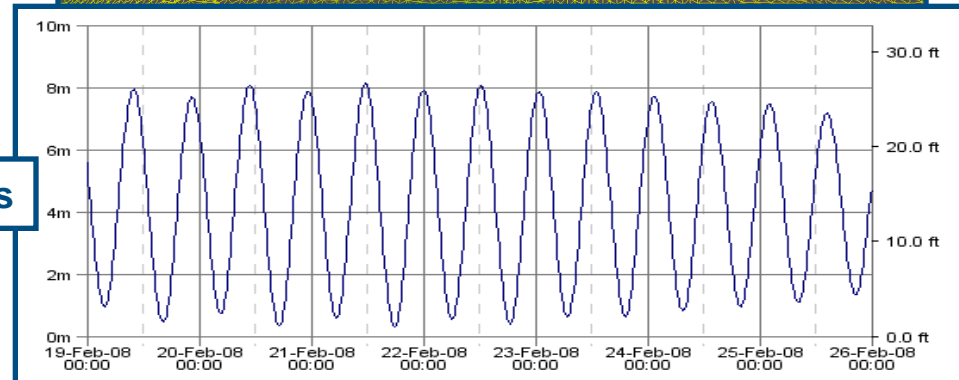


- Hydrographic Operational Efficiency
- Interoperable RDBMS core
  - with software clients delivering data processing, visualisation and access efficiencies
- Features of the SDI include
  - Control and transfer of hydrographic information
  - Encapsulation of Metadata
  - Web based data discovery and access
- INFRAGEOS-H enables SHOM to conform to international and INSPIRE standards for data normalisation and dissemination

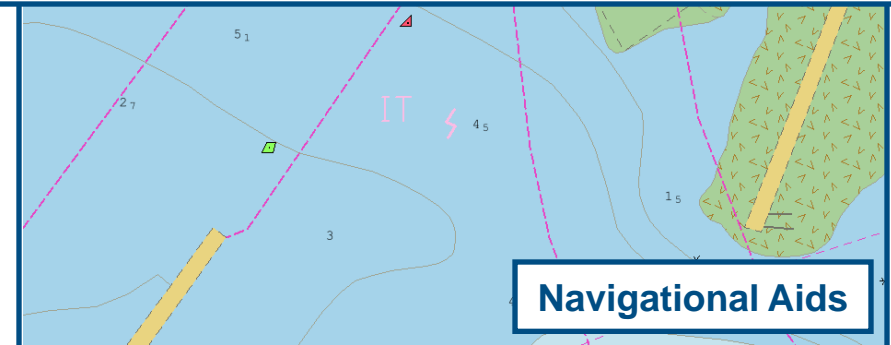
- Types of Marine Data
  - Bathymetry
    - Multibeam Sonar
    - Single Beam Sonar
    - LiDAR
    - Legacy sounding data
  - Navigational Aids
    - Bouys
    - Lights
    - Beacons
  - Tides
    - Stations
    - Observations



Tides

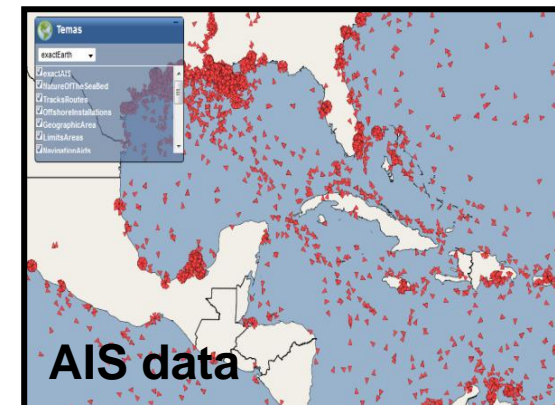
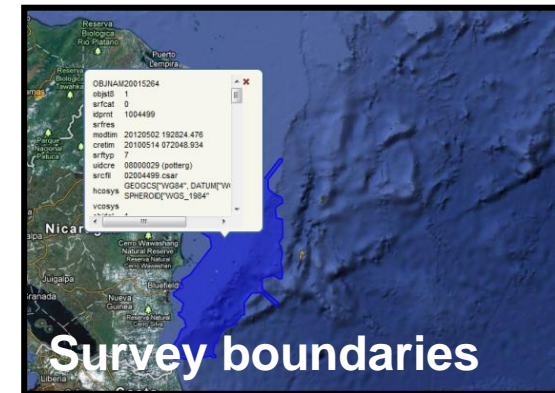
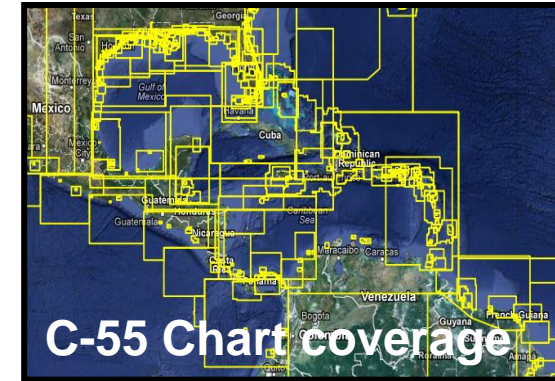


Navigational Aids



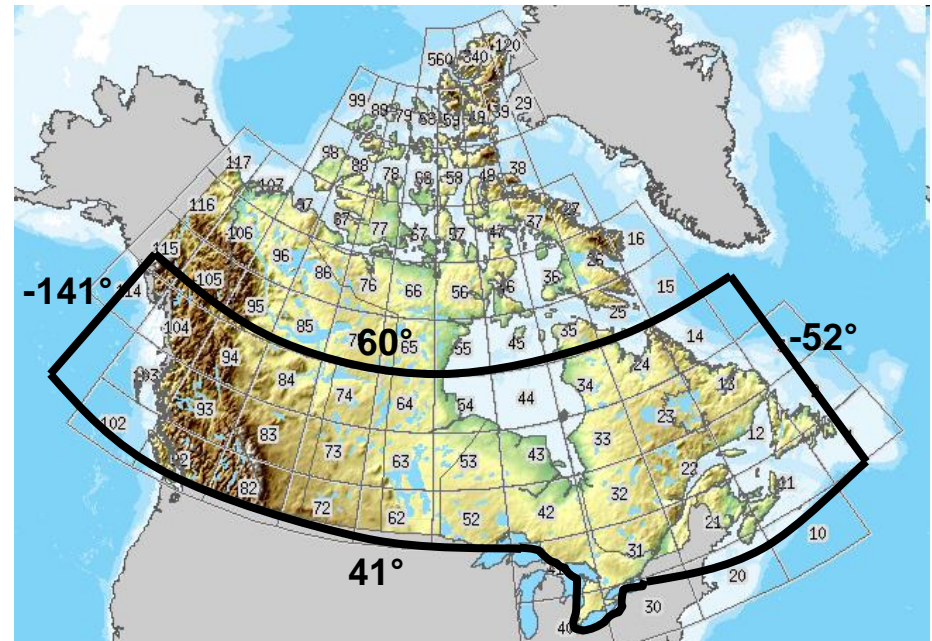
- Mesoamerican and Caribbean Sea Hydrographic Commission
- MEIP - Marine Economic Infrastructure Program
- Regional SDI to promote economic development
- Idea is to drive hydrographic survey projects in the region
- Challenge is to get countries to contribute their data

<http://aws1.caris.com:8080/meip>



- CHS and NRCan are collaborating to deliver Continuous Seamless DTMs through the CDED
- Topography Unified to Bathymetry (TUB)
- Z+ve upwards and referenced to MSL
- Coverage below 60°N with cells at 1:250,000
- 500m resolution
- Available as USGS grids for download
- With FGDC metadata

<http://www.geobase.ca>





- CARIS BDB used to:
  - Resolve CRS differences
  - Combine DTMs
  - Extrapolate data sea to shore





‘increase the capacity ... to collect and use bathymetric and topographic data to support management of tsunami risk in coastal areas’



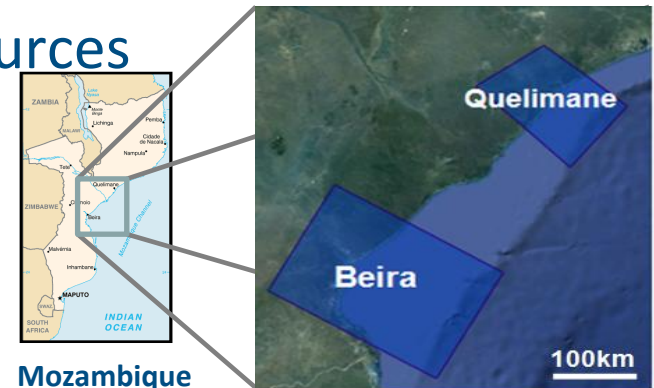
Intergovernmental  
Oceanographic  
Commission

## Management of tsunami risk in coastal areas

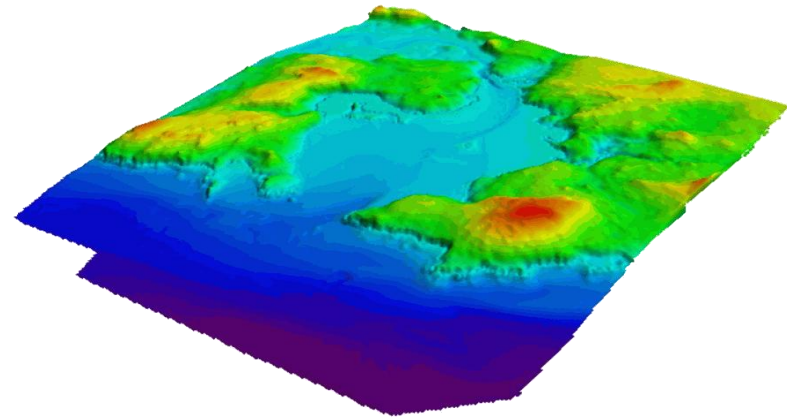
Mozambique, Tanzania, Kenya, Madagascar,  
Mauritius, Seychelles, Comoros, Maldives,  
Bangladesh, Myanmar, Sri Lanka, Thailand



- Partners for Water programme (2011-2012)
  - Implement a TopoBathy Database at INAHINA
- Increase the capacity of countries to collect and use bathymetric and topographic data
  - Project in Mozambique according to Coast-Map-IOI recommendations
  - Establishment seamless bathymetric and topographic db
  - Management of existing and new sources



- Resulting in TopoBathy Database
- Multiple organizations providing data
  - Data varies in type, resolution, elevation, ...
- Mozambique organizations responsible
  - INAHINA (Bathymetric Data)
  - CENACARTA (Topographic Data)
  - INAM (Tsunami Modeling)
- Local staff was trained
- Other usage considered
  - E.g. use for production of Nautical Products



## Education and Capacity Building

- OceanWise leads the theoretical content
- CARIS leads the “hands-on” practical content
- Topics include:
  - SDI Policy, Technical Standards and Geographic Content
  - Data Modeling, Data Organization and Infrastructure
  - Data Management, Production and Interoperability
  - Human Aspects, Change Management and Sustainability
- 63 persons working in hydrography trained in SDI so far!



# Education and Capacity Building

## Bangkok, Thailand (2011)

- Hosted by the Hydrographic Department of the Royal Thai Navy (NDRTN) on behalf of the EAHC
- 20 students from China, Indonesia, Japan, Malaysia, Philippines, Korea, Singapore, Vietnam and Thailand



## Colombo, Sri Lanka (2012)

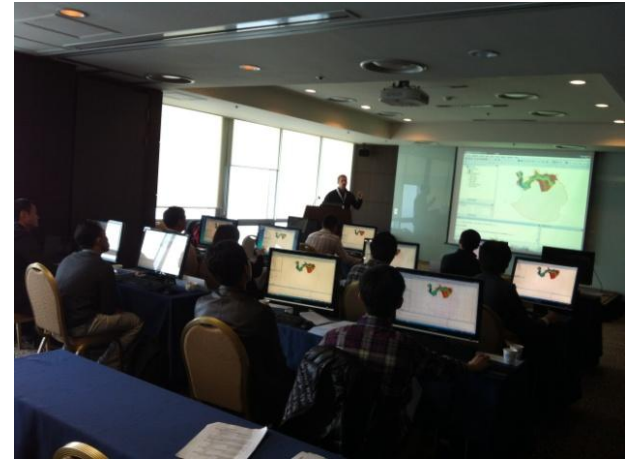
- Hosted by the Sri Lankan National Aquatic Resources Research and Development Agency (NARA) on behalf of the NIOHC and SAIHC
- 15 students from Bangladesh, Comoros, Kenya, Malawi, Namibia, Oman, Saudi Arabia, Sri Lanka and Tanzania



# Education and Capacity Building

## Incheon, Republic of Korea (2012)

- Hosted by the Korea Hydrographic and Oceanographic Administration (KHOA) on behalf of the EAHC
- 15 students from Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines and Thailand



## Niteroi, Brazil (2012)

- Hosted by Diretoria de Hidrografia e Navegação (DHN) on behalf of the SWAtHC and SEPHC
- 13 students from Brazil, Argentina and Uruguay, Guatemala, Chile and Colombia





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