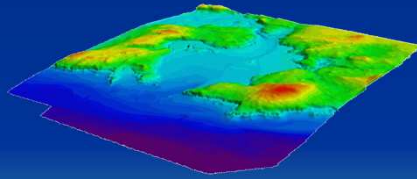


# TopoBathy Database Mozambique

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Charles de Jongh and peter Schwarzberg (Netherlands)



Montevideo Uruguay, 28<sup>th</sup> November 2012

Frederickton - Canada - Newark - The Netherlands - Washington DC - United States - Adelaide - Australia

### CARIS TopoBathy Database Mozambique

#### Project Context

- Lesson Map of Project (2007-2009)
- Project Overview
- Project Objectives
- Project Partners
- Project Timeline

#### From Data to Knowledge

- Why a TopoBathy Database
- Knowledge by Process
- Knowledge by Product

#### Project Agenda

- Project Objectives
- Project Deliverables
- Project Milestones
- Project Risks

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#### Building the TopoBathy Database

- Work & Reporting
- Working & Reporting
- Project & Reporting
- Project & Reporting

## Project Context – Past: Coast-Map-IO Project (2007-2009)



'The focus of COAST-MAP-IO is to increase the capacity of countries to collect and use bathymetric and topographical data to support management of tsunami risk in coastal areas.'

**Participating countries: Mozambique (INAHINA),** Tanzania, Kenya, Madagascar, Mauritius, Seychelles, Comoros, Maldives, Bangladesh, Myanmar, Sri Lanka, Thailand.

## Coast-Map-IO Project Goals

- Improve national expertise to locally produce accurate bathymetric and topographic maps on either side of the coastline.
- Strengthen modelling capacity for inputs to tsunami arrival, run-up and inundation in coastal areas.
- Facilitate the transfer of necessary skills to national disaster Management agencies to use bathymetric and terrestrial datasets in developing targeted maps and services, including inundation maps, determination of set back lines, coastal ecosystem mapping, and zonation for coastal users.

## Project Involvement by CARIS

CARIS has been involved in the Coast-Map-IO project with sponsorship & expert training:

- CARIS HIPS, 2008 & 2009.

Alfred Wegner Institute,

Germany

(with delegate of INAHINA)



- CARIS HIPS & BASE Editor, 2009.

Royal Thai Navy, Bangkok,

Thailand

(with delegate of INAHINA)



## IHO/IOC Coast-Map-IO Assessment Mission Mozambique Recommendations (2007)



1. Due to the essential role of bathymetry in the project, the Instituto Nacional De Hidrografia e Navegação (INAHINA) should be responsible for the establishment and management of the seamless COAST-MAP-IO bathymetric and topographic database.



2. Appropriate means and training should be provided to manage the bathymetric and topographic database which will result from Recommendation 1 above.

- CARIS & BMT ARGOSS have received a grant from the Partners for Water program.
- This grant will help to set up and implement a **TopoBathy Database** at INAHINA for the pilot areas of **Beira & Quelimane**.



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Government of the Netherlands

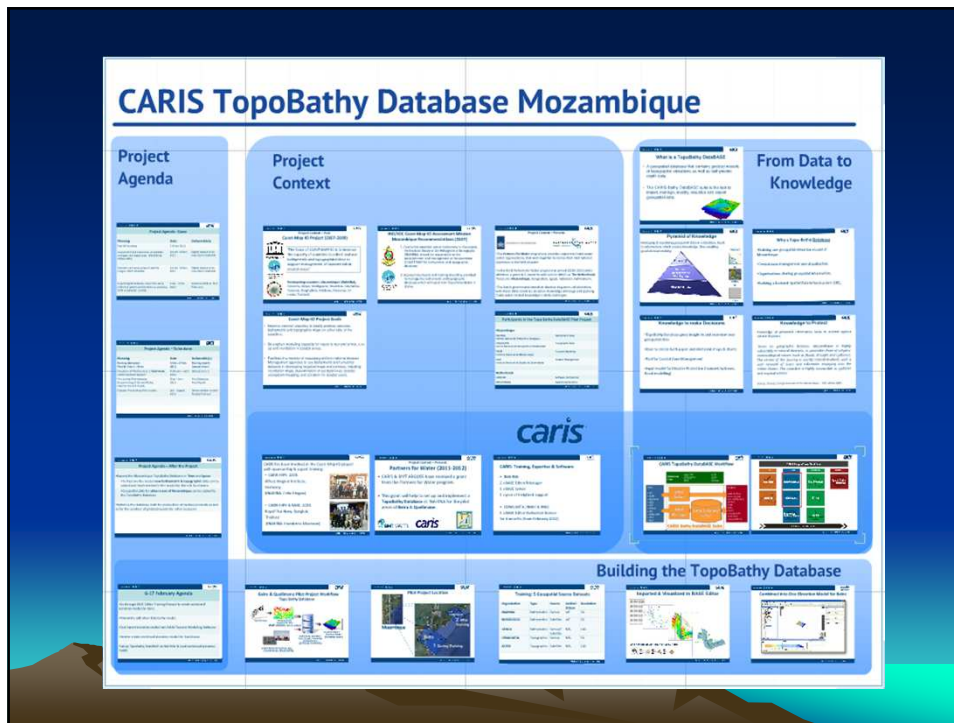


**PARTNERS VOOR WATER**  
Bundeling van krachten

- The **Partners for Water** programme provides support to Dutch water sector organisations, that work together to realise their international objectives in the field of water.
- In the third Partners for Water programme period (2010-2015) extra attention is given to 5 countries with similar delta's as **The Netherlands**. These are: **Mozambique**, Bangladesh, Egypt, Indonesia and Vietnam.
- The Dutch government intends to develop long-term collaborations with these delta countries based on knowledge exchange and applying Dutch water related knowledge in delta challenges.

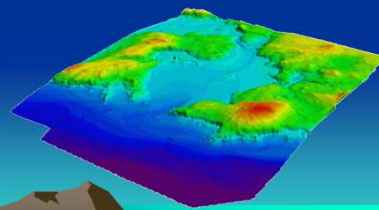
| <b>Participants in the Topo Bathy DataBASE Pilot Project</b>      |                      |
|---|----------------------|
| <b>Mozambique</b>   |                      |
| <b>INAHINA</b><br>Instituto Nacional de Hidrografia e Navegaçao   | Bathymetric Data     |
| <b>CENACARTA</b><br>Centro Nacional de Cartografia e Teledetecção | Topographic Data     |
| <b>INAM</b><br>Instituto Nacional de Meteorologia                 | Tsunami Modeling     |
| <b>Netherlands</b>  |                      |
| <b>CARIS BV</b>   | Software & Expertise |
| <b>BMT-ARGOSS</b>   | Satellite Bathymetry |

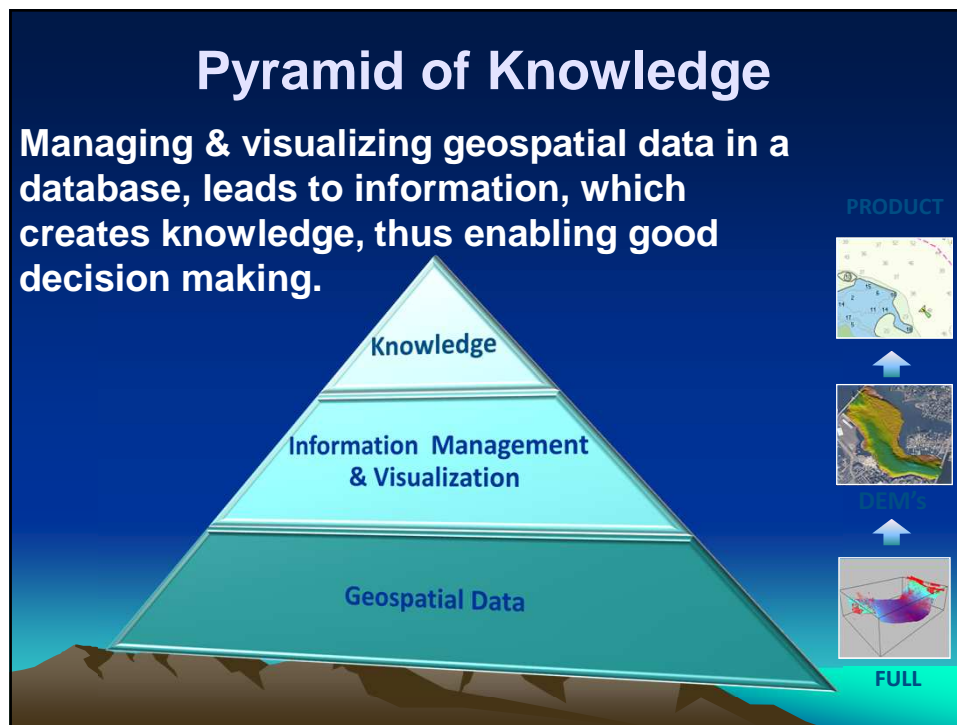
| <b>Project: Software, Data, Training &amp; Consultancy</b>                 |
|--|
| <b>INAHINA</b>   |
| 3 weeks CARIS BASE Editor & Bathy Database Training & Consultancy          |
| 2 x CARIS BASE Manager & BASE Server Licence                               |
| 1 Year of Updates & HelpDesk support                                       |
| <b>BMT ARGOSS:</b> Bathymetric Datasets for pilot areas Beira & Quelimane  |
| <b>CENACARTA &amp; INAM</b>  |
| 1 week CARIS BASE Editor Training  |
| 1 x CARIS BASE Editor Evaluation licence for 6 months (from February 2012) |



## What is a TopoBathy DataBase

- A geospatial database that contains gridded models of topographic elevations as well as bathymetric depth data.
- The CARIS Bathy DataBase suite is the tool to import, manage, modify, visualize and export geospatial data.





## Knowledge to make Decisions

- TopoBathy Database gives insight in and overview over geospatial data
- Base to create both paper and electronic maps & charts
- Tool for Coastal Zone Management
- Input model for Disaster Protection (tsunami/cyclones, flood modelling)

## Knowledge to Protect

Knowledge of geospatial information helps to protect against natural disasters:

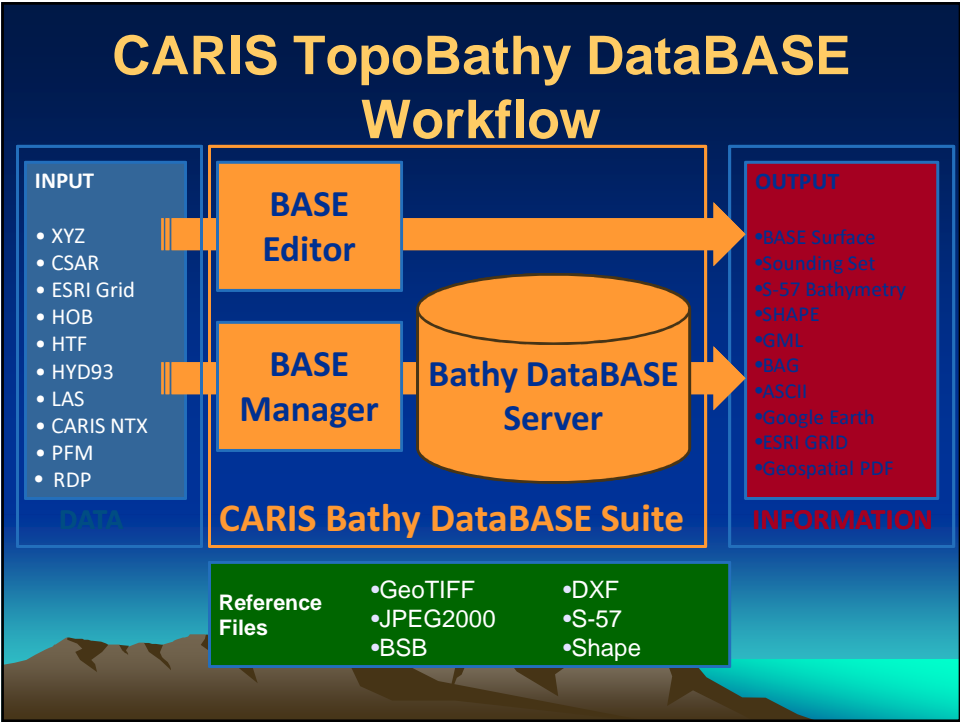
*'Given its geographic location, Mozambique is highly vulnerable to natural disasters, in particular those of a hydro-meteorological nature (such as floods, drought and cyclones). The terrain of the country is mostly coastal lowland, with a vast network of rivers and tributaries emptying into the Indian Ocean. The coastline is highly susceptible to cyclones and tropical storms.'*

Source: Climate Change Assessment for Mozambique - UN Habitat, 2009.

## Why a Topo-Bathy Database

- Building one geospatial elevation model of Mozambique
- Central data management and visualization.
- Organisations sharing geospatial information.
- Building a National Spatial Data Infrastructure (SDI).





## CARIS TopoBathy Database Mozambique

**Project Agenda**

**Project Context**

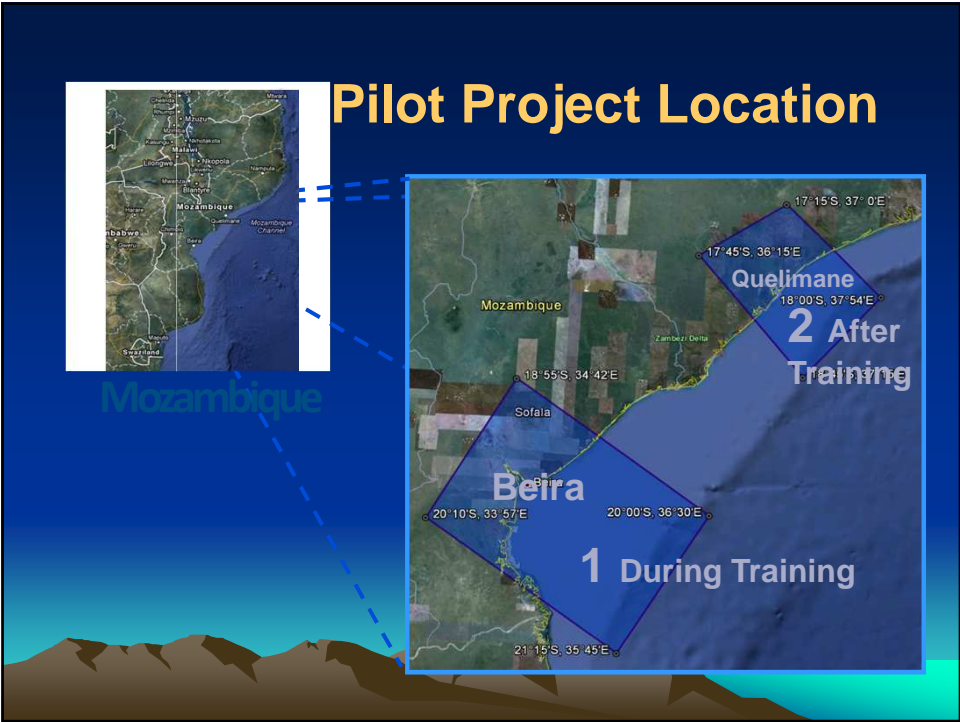
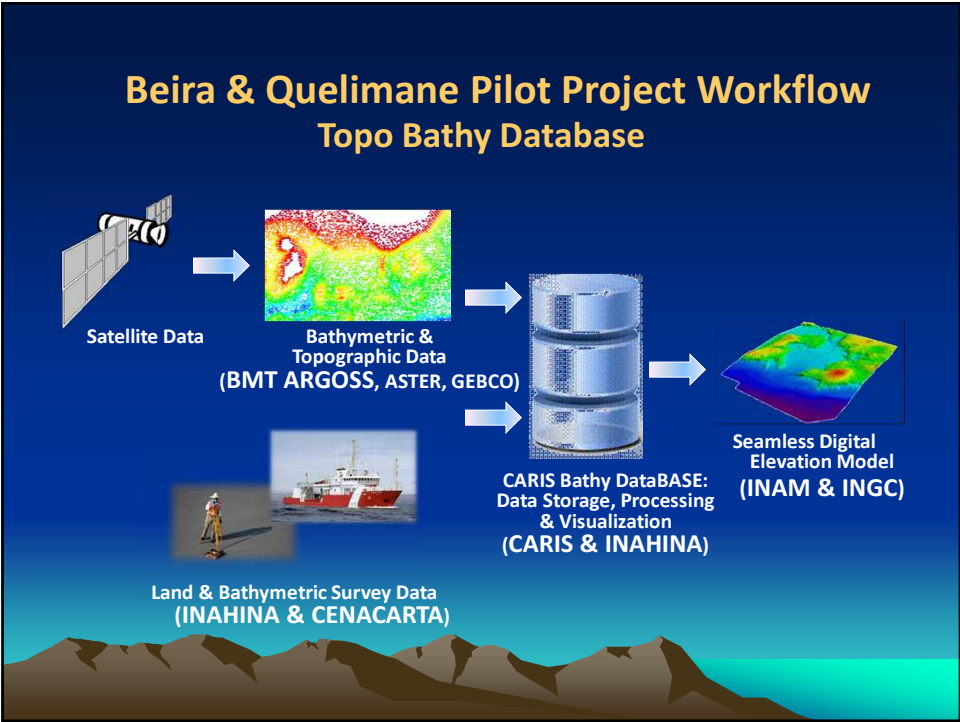
**From Data to Knowledge**

**Building the TopoBathy Database**

**CARIS Training, Expertise & Software**

| Project Agenda - Done   |                      |  |
|---|----------------------|--|
| Planning  | Data                 | Deliverable(s)                                       |
| Assessment and conversion of available analogue and digital data. (INAHINA & CENACARTA)                               | 10 Oct.-30 Dec. 2011 | Digital datasets to be imported in BathyDB           |
| Selection and processing of satellite images. (BMT ARGOSS)  | 10 Oct.-30 Dec. 2011 | Digital datasets to be imported in BathyDB           |
| Import digital datasets, convert to same reference system and combine as seamless elevation model in BathyDB. (CARIS) | 2 Jan.- 3 Feb. 2012. | Seamless elevation model of first Pilot Area (Beira) |
| Complete Training Manual for Beira  | 2 Jan.- 3 Feb. 2012. | Training Manual                                      |

| Project Agenda – Further Activities  |                            |  |
|--|----------------------------|--|
| Planning   | Data                       | Deliverable(s)                                     |
| Maputo: Training Workshop Pilot for Area-1 : Beira (INAHINA, CENACARTA, INAM, CARIS) | 6 Feb.-17 Feb. 2012.       | -Training manual<br>-Combined Dataset Beira        |
| Execution of Pilot for Area-2: Quelimane (INAHINA). CARIS HelpDesk Support           | February – June 2012.      | -Combined Dataset Quelimane                        |
| Documenting of the workflows, experiences and results. (INAHINA)                     | February– June 2012        | -INAHINA Report                                    |
| Maputo: Consultancy & Presenting of the results. (INAHINA, CENACARTA, INAM,          | 1 week<br>July/August 2012 | -Final Datasets Beira & Quelimane<br>-Final Report |



| Training: 5 Geospatial Source Datasets |             |                      |                |                |
|--|-------------|----------------------|----------------|----------------|
| Organization                           | Type        | Source               | Vertical Datum | Resolution (m) |
| INAHINA                                | Bathymetric | Survey               | LAT            | 30             |
| BMTARCOSS                              | Bathymetric | Satellite            | LAT            | 50             |
| GEMCO                                  | Bathymetric | Survey/<br>Satellite | MSL            | 100            |
| CENACARTA                              | Topographic | Survey               | MSL            | 50             |
| ASTER                                  | Topographic | Satellite            | MSL            | 100            |

## Imported & Visualized in BASE Editor

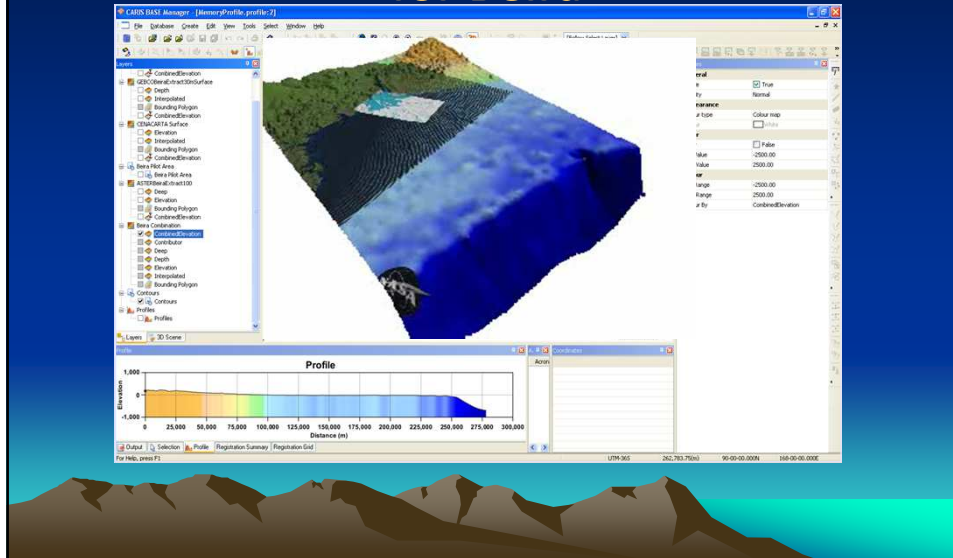
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19-38-49.525,034-40-56.76E,-3.776
19-38-49.495,034-41-00.19E,-3.711
19-38-49.465,034-41-03.63E,-3.646
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```

XYZ > Point Cloud > TIN > BASE Surface

## Combined into One Elevation Model for Beira



### Training Activities

- ✓ Go through BASE Editor Training Manual to create combined elevation model for Beira.
- ✓ Set up TopoBathy DataBase at INAHINA & Load combined elevation model.
- ✓ Start to create combined elevation model for Quelimane.
- ✓ Add other data to the model.
- Test Import elevation model into Tsunami Modelling Software

## Project Agenda – After the Project

- Expand the Mozambique TopoBathy Database in **Time** and **Space**
  - To improve the model **New Bathymetric & Topographic Data** can be added and implemented in the model for Beira & Quelimane.
  - Geospatial data for **Other areas of Mozambique** can be added to the TopoBathy Database
- Optimize the database both for production of **Nautical Products** as well as for the creation of **Gridded Models** for other purposes

