

Create a benthic community type map of Aitutaki lagoon based on integration of field data and satellite image analysis.

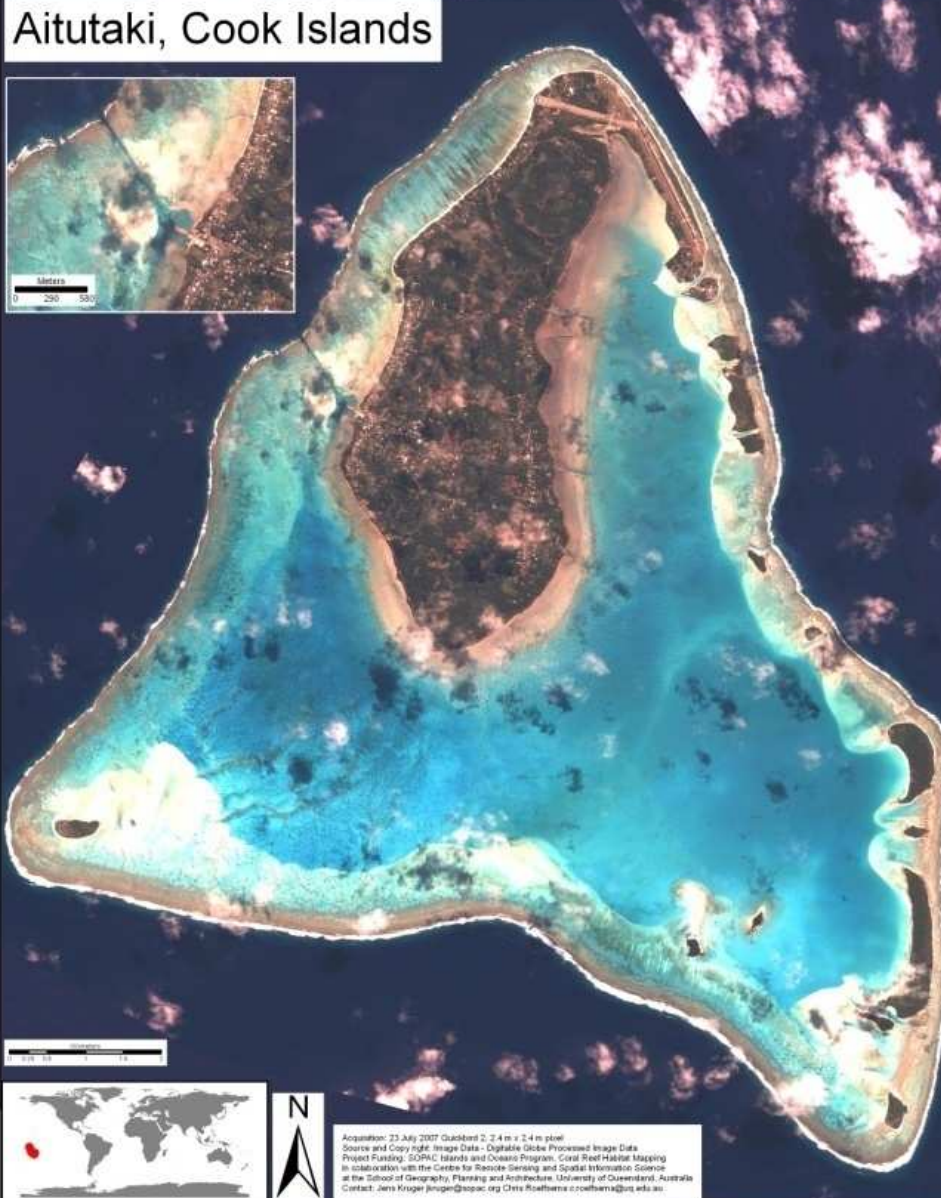
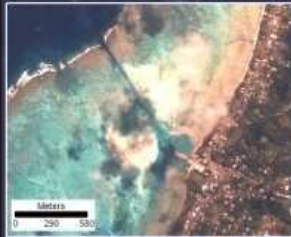
Habitat Maps



- A habitat is the place where a particular species lives or biotic community is normally found, and is often characterised by the dominant life form (e.g. seagrass bed habitat) or physical characteristics (e.g. sandy intertidal habitat).
- Benthic habitat maps are designed to be used to understand and predict moderate depth (~10 - 20m) benthic habitats for different organisms that inhabit coral reef ecosystems.

Field component

Aitutaki, Cook Islands



Acquisition: 23 July 2007 QuickBird 2, 2.4 m x 2.4 m pixel
Source and Copyright: Image Data - DigitalGlobe Processed Image Data
Project Funding: SOPAC Islands and Oceans Program, Coral Reef Habitat Mapping
in collaboration with the Centre for Remote Sensing and Spatial Information Science
at the School of Geography, Planning and Architecture, University of Queensland, Australia
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Planning areas for transects
Getting control points for
geo-rectification

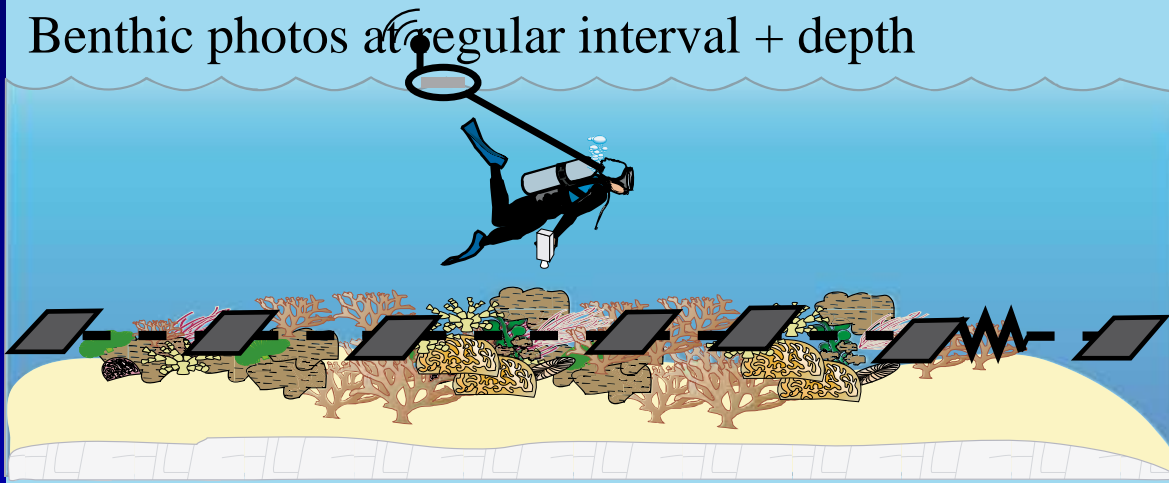


The actual field work

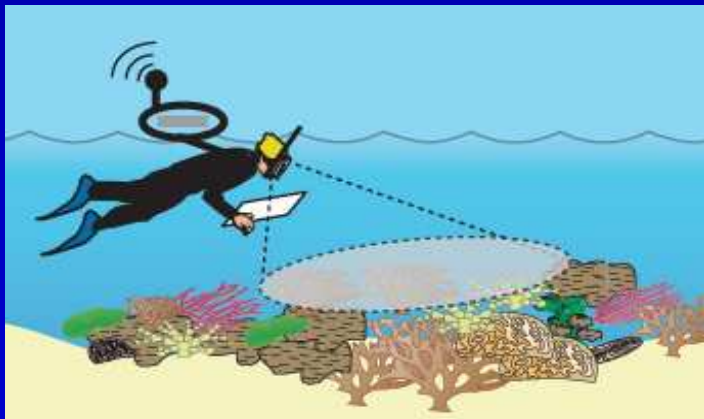
Field Data Collection

Photo Transect

Benthic photos at regular interval + depth



Spot Check



Field Data Analysis



Photos and GPS track are downloaded and GPS-Photo Link software used to generate a co-ordinate for every photo by referring to the time it was taken.



Office component

Aitutaki, Cook Islands

Map: Field data

Imagery: Quickbird 2007

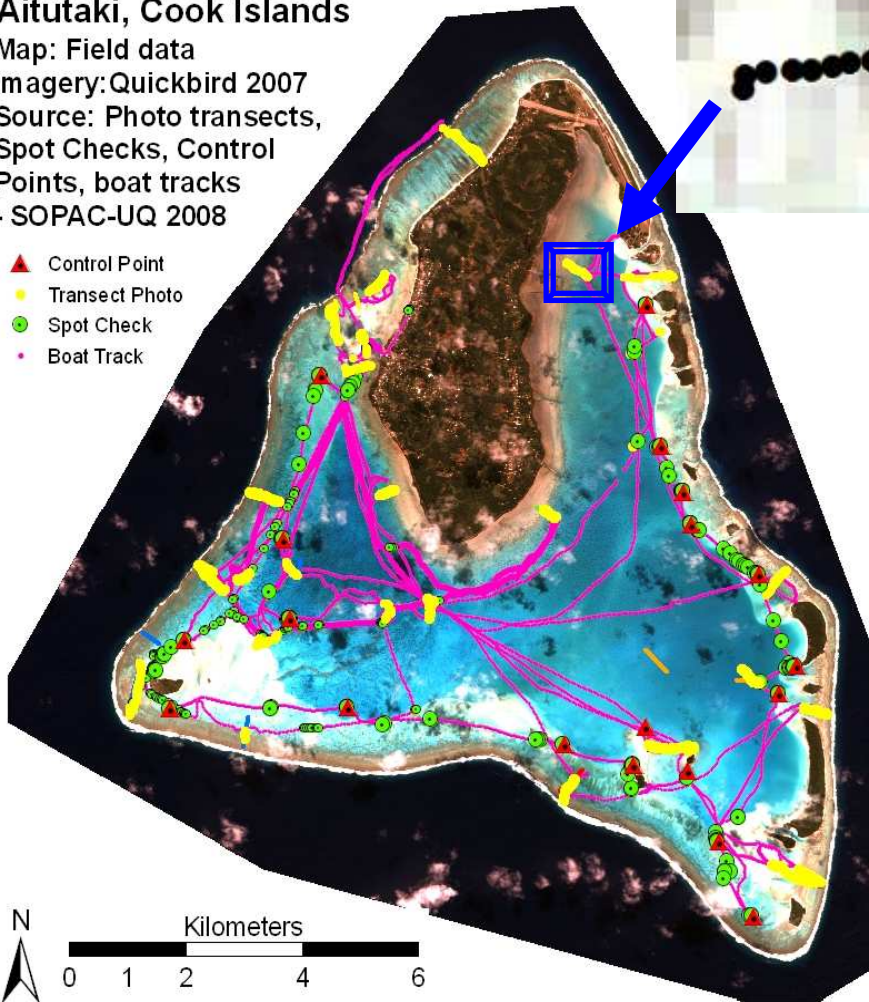
Source: Photo transects,

Spot Checks, Control

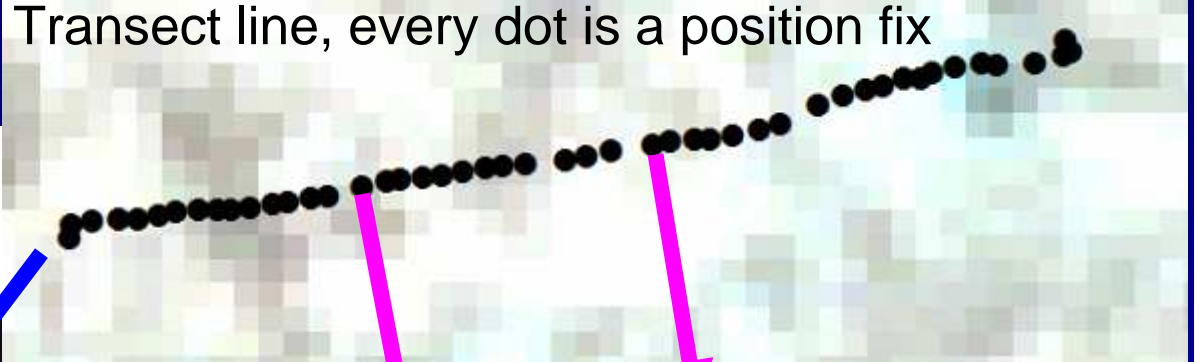
Points, boat tracks

- SOPAC-UQ 2008

- ▲ Control Point
- Transect Photo
- Spot Check
- Boat Track



Transect line, every dot is a position fix



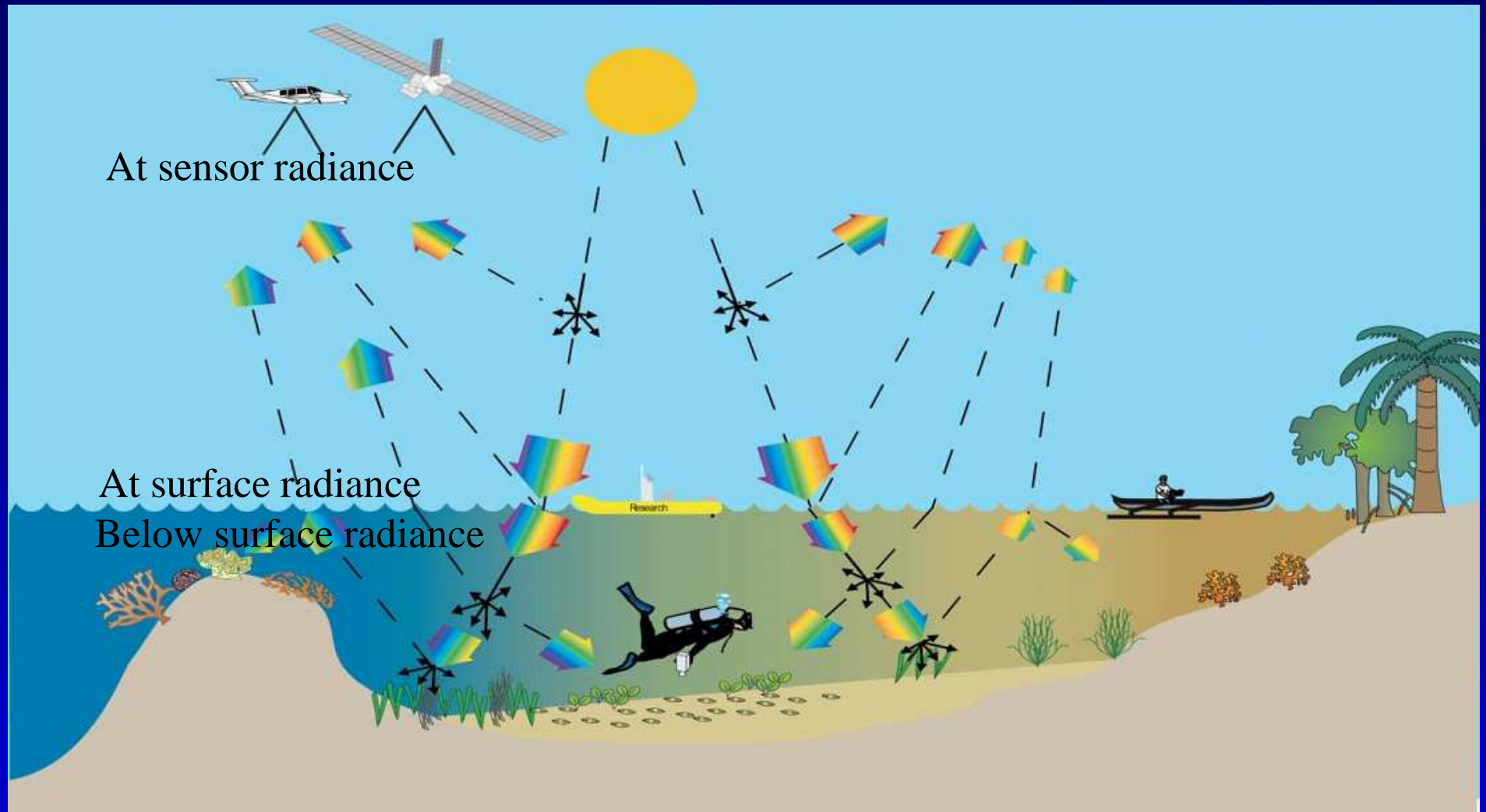
Categorising photos via CPCe



AL	Algae
ALRO	Algae and Rock
ALRU	Algae and Rubble
ALSD	Algae and Sand
BSRO	Rock
BSRU	Rubble
BSSD	Sand
LC	Live Coral
LCAL	Live Coral and Algae
LCDC	Live Coral and Dead Coral
LCRO	Live Coral and Rock
LCRU	Live Coral and Rubble
LCSD	Live Coral and Sand

Using CPCe, each photo was labeled with 1 out of 32 options (e.g. coral, algae, sand, coral and rock etc)

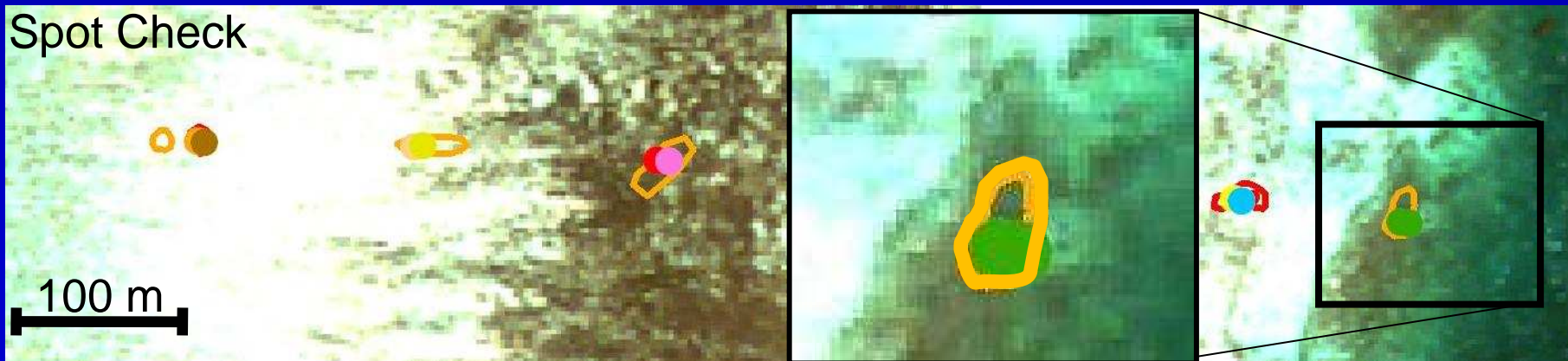
Marine Remote Sensing



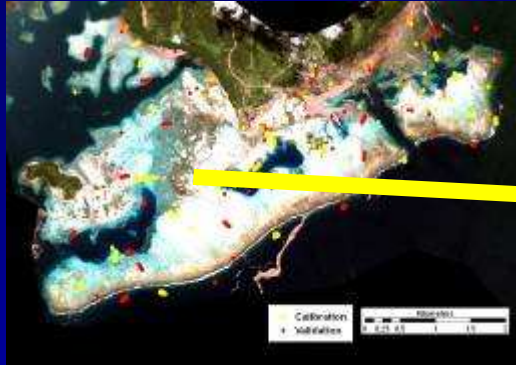
- Convert to at-sensor radiance
- Dark pixel correction
- Reduce sun-glint

Creation of areas of interest

- Data point is labeled with map category based on its composition
- Data points (& photos) + image colour & texture, are used to create areas of interest (AOI)



Supervised classification



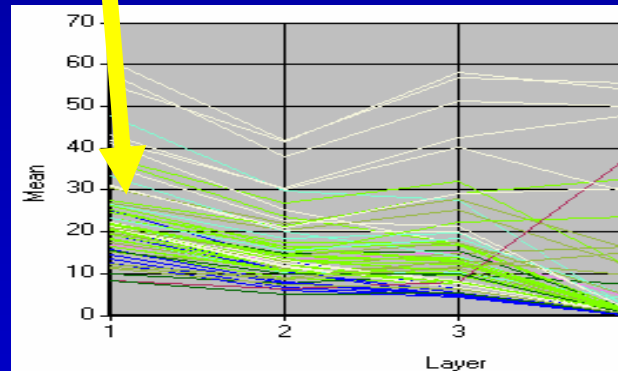
Calibration Data
(50% of AOI's)



Selection of training areas



Image Data

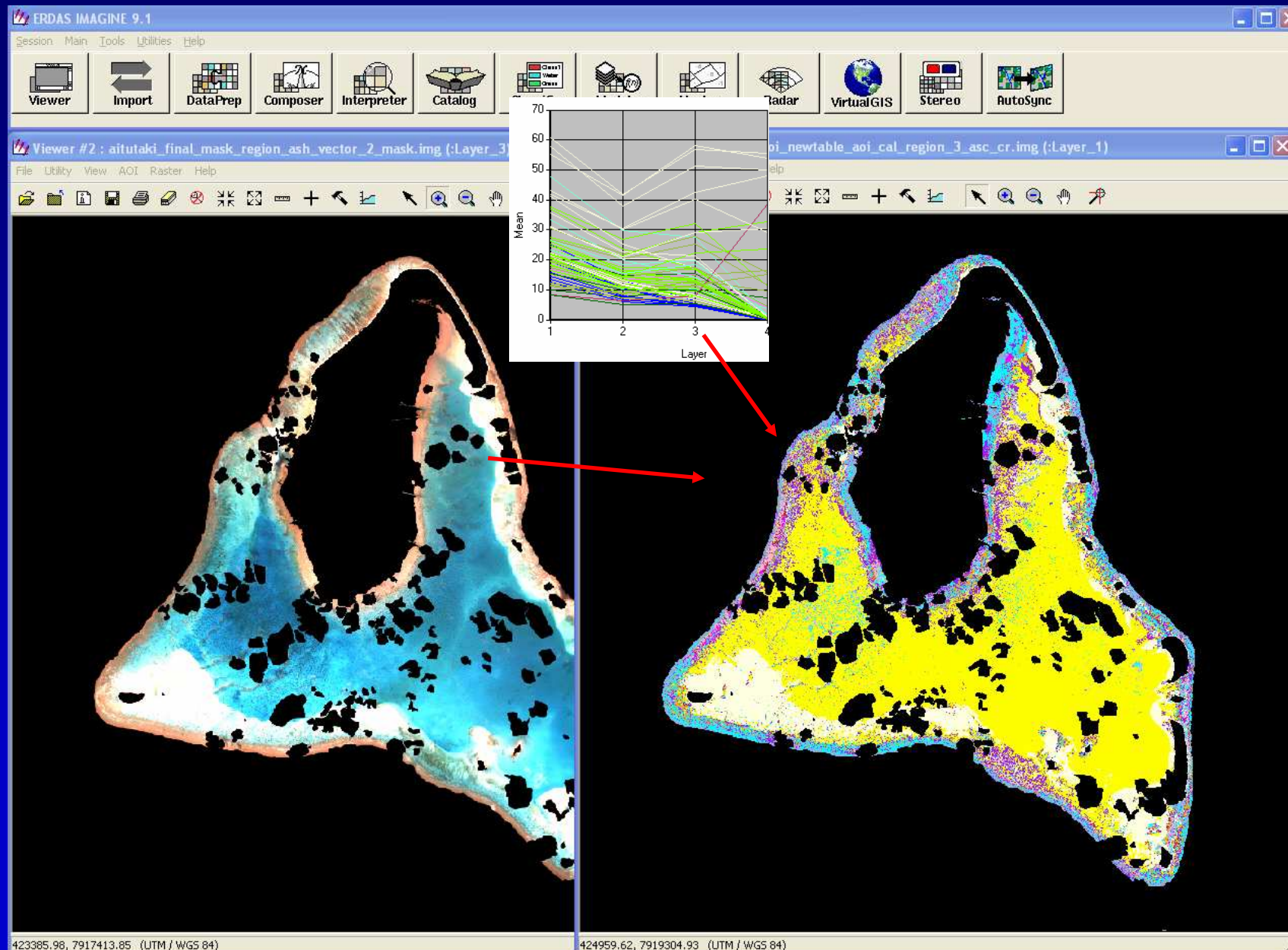


Extraction of signatures
for each training areas

AOI's - Signatures

- Assessment
- Merging

Supervised classification



Outcome

Aitutaki, Cook Islands

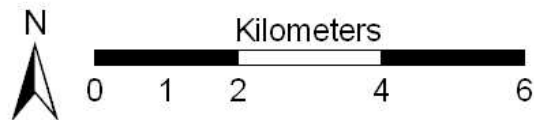
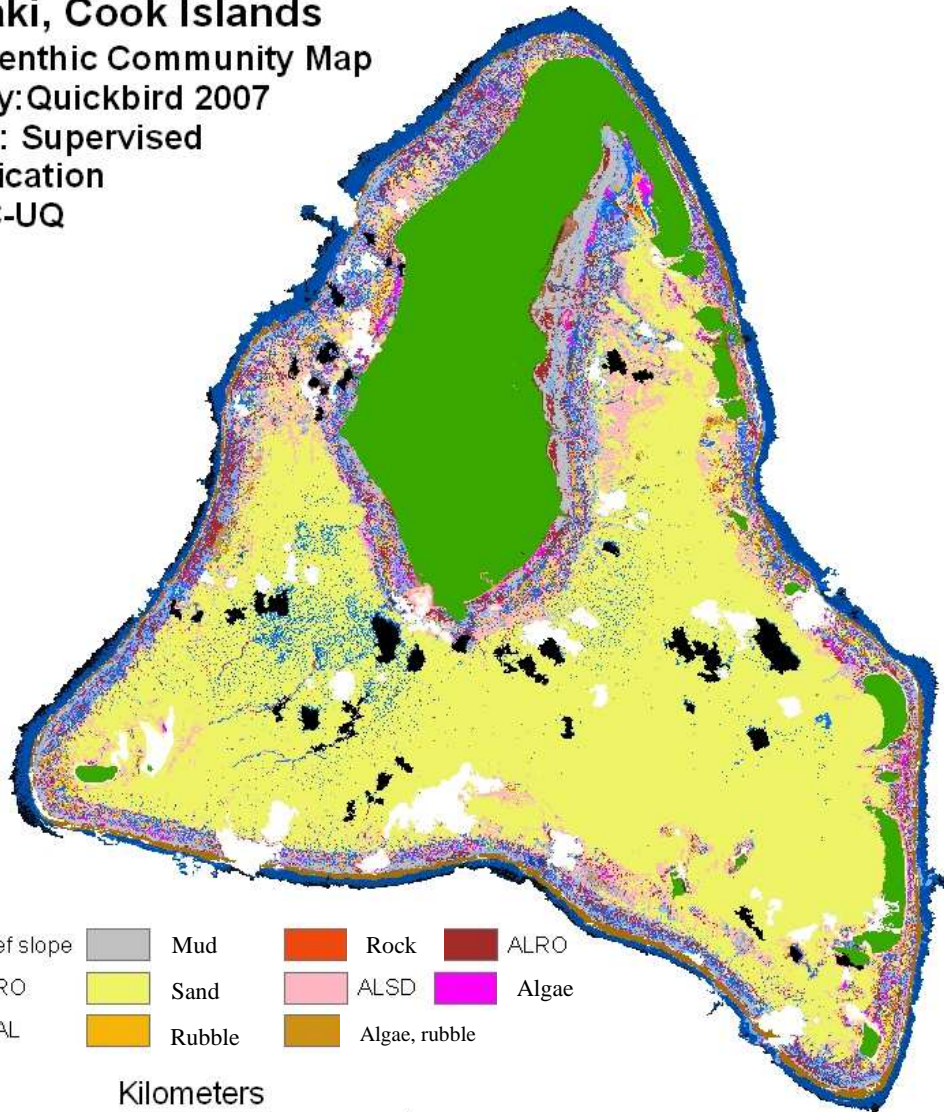
Map: Benthic Community Map

Imagery: Quickbird 2007

Source: Supervised

Classification

SOPAC-UQ



- Accuracy assessment

Map scale 1:20 000

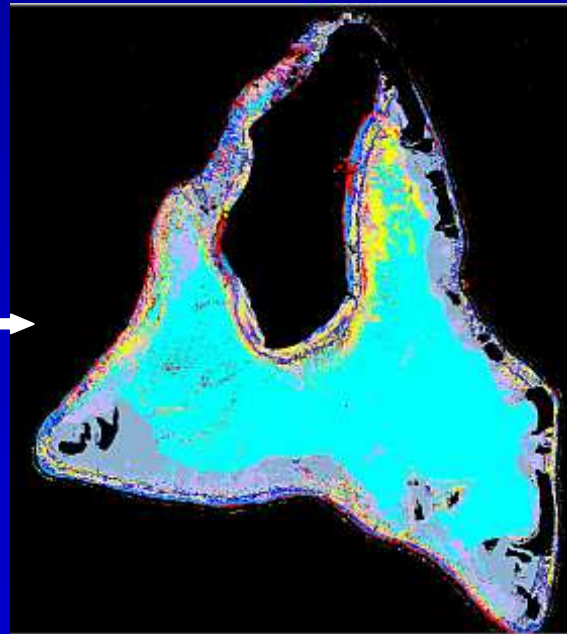
Map with accuracy of 60%

To be used in conjunction with a hydrodynamic model to see how water levels will affect different habitats.

Conclusion

HABITAT MAPPING

- Characterisation of the seabed serves as baseline information for ecosystem-based management and sustainable resource extraction.
- Habitat maps have multiple uses: coastal development, conservation, tourism, fisheries, etc.
- Repeatable for monitoring purposes.
- List of users and benefits is growing with distribution of datasets



- ALOS Image
- Cheaper
- 10m pixels compared to Quickbird 2.5m pixels
- Low costs for repeatability