

Crowdsourced bathymetry on the Great Barrier Reef

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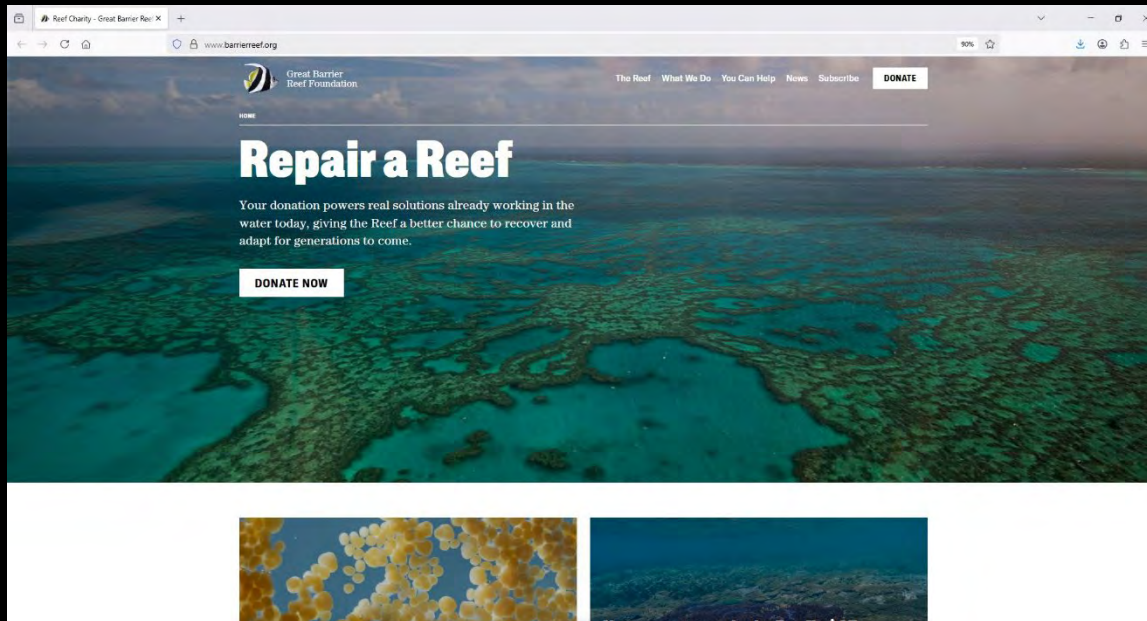


Introduction

- Crowdsourced bathymetry (CSB) is collection of depth measurements from vessels, using standard navigation instruments engaged in routine operations.
- International Hydrographic Organisation (IHO) accepts CSB data into the Data Centre for Digital Bathymetry (DCDB) through a network of 'Trusted Nodes'.
- The 'Crowdsourced bathymetry on the GBR' project is a Trusted Node.
- Talk will focus on how CSB data are collected, processed and made public.

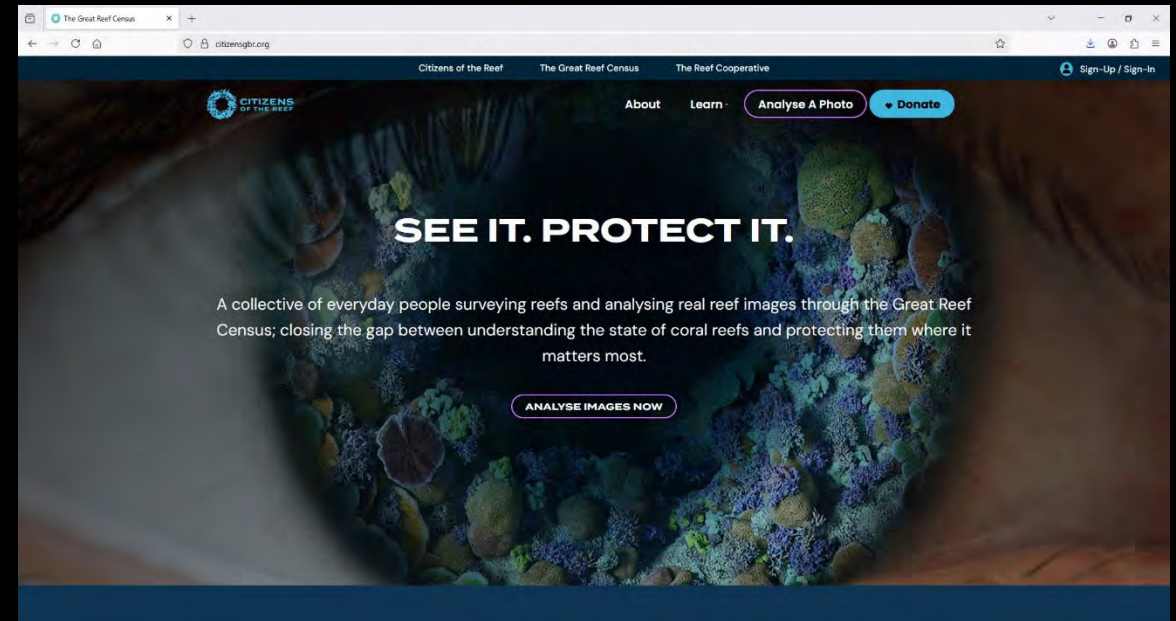
Funding and support

- Great Barrier Reef Foundation



GBR Foundation at: <https://www.barrierreef.org/>

- Citizens of the Reef



Citizens of the Reef at: <https://citizensgbr.org/>

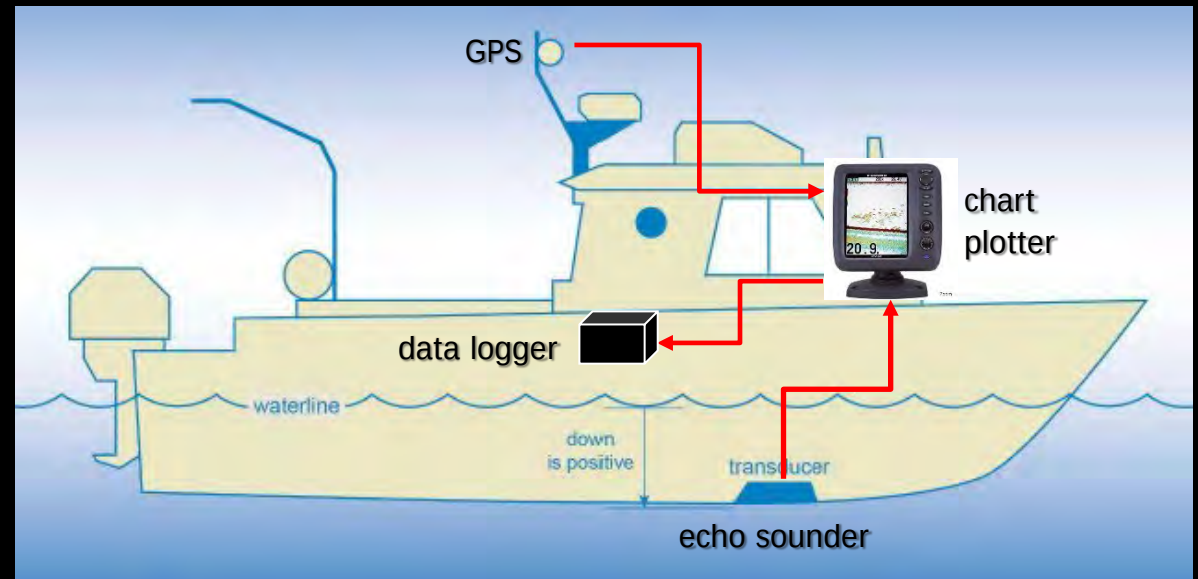
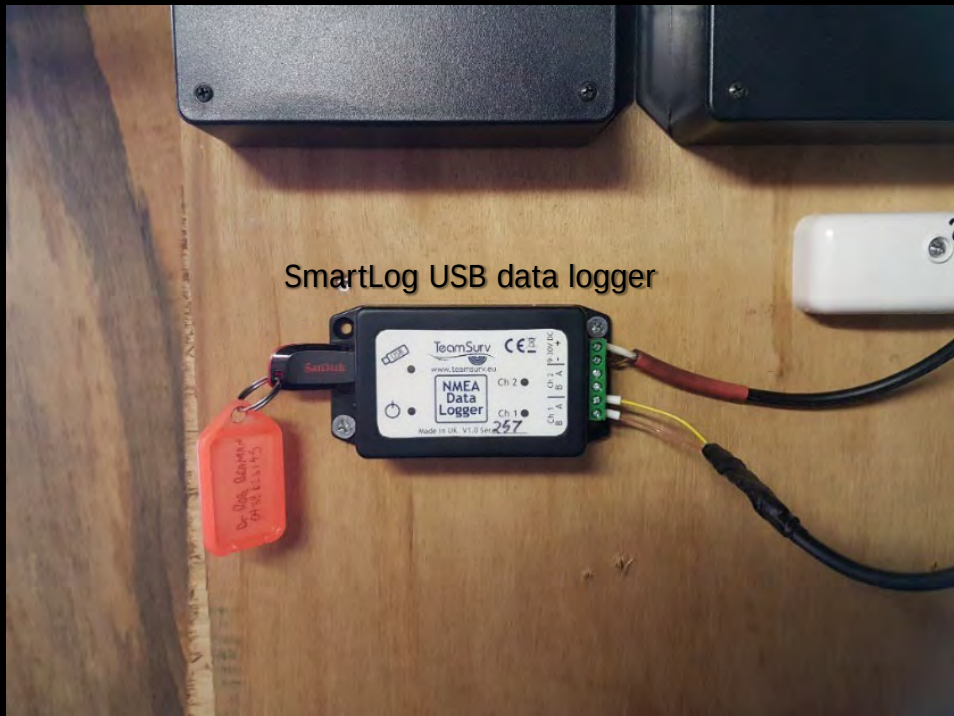
Technology

- TeamSurv SmartLog USB logger
- 12/24VDC plus NMEA channel 1
- reliable but sensitive to over-voltage

- stores raw NMEA 0183 to USB logger

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$GPGGA,022018,1617.7499,S,14541.6567,E,1,11,0.84,-62.51,M,59.91,M,,*76
$GPBWC,022020,1617.3701,S,14541.0190,E,301.8,T,295.0,M,0.721,N,End,A*37
$SDDBT,3.74,f,1.14,M,0.62,F*36
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Vessels

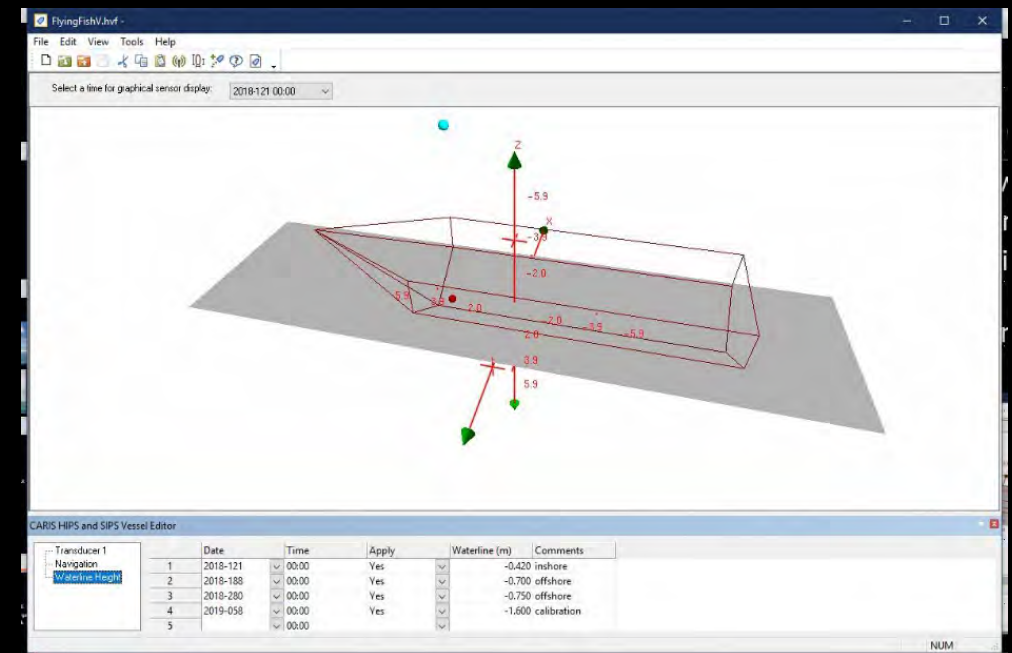


Chart plotters



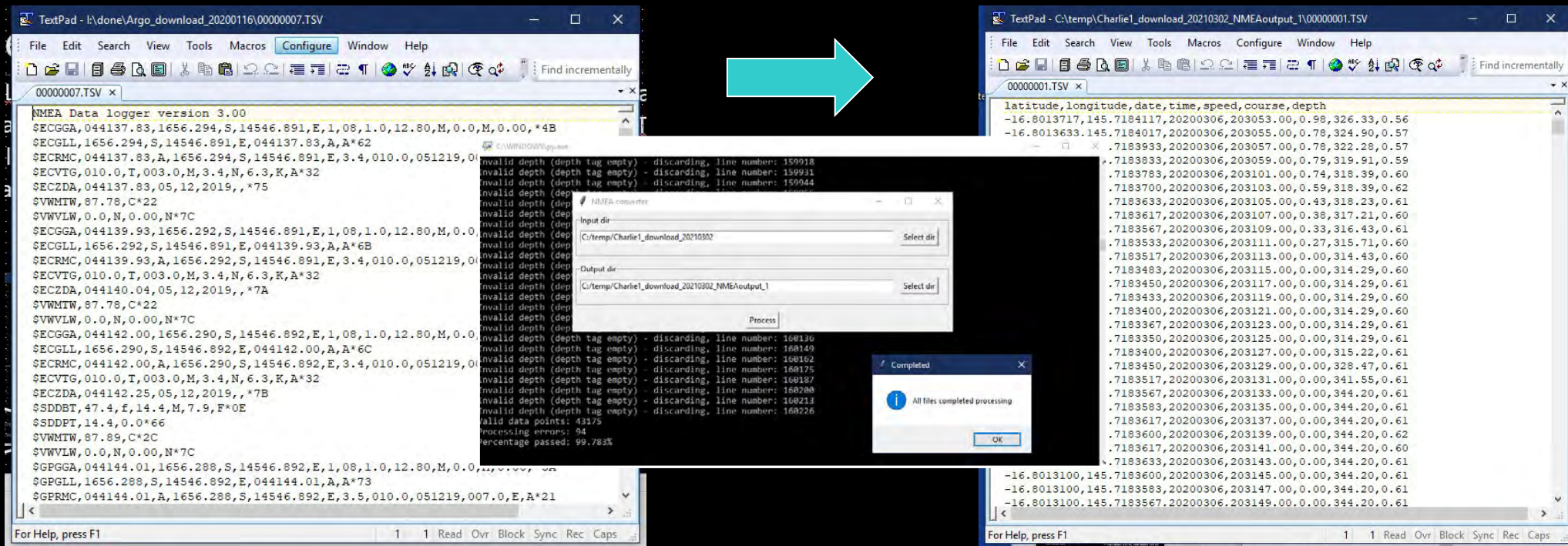
Installation

- marine technician to install
- mount in dry sheltered place
- avoid two NMEA channel feeds
- switch or fuse helps to kill power
- use 30 m tape to measure offsets
- reference point (RP) is the sounder
- GPS aerial is measured to sounder
- measure waterline height to RP



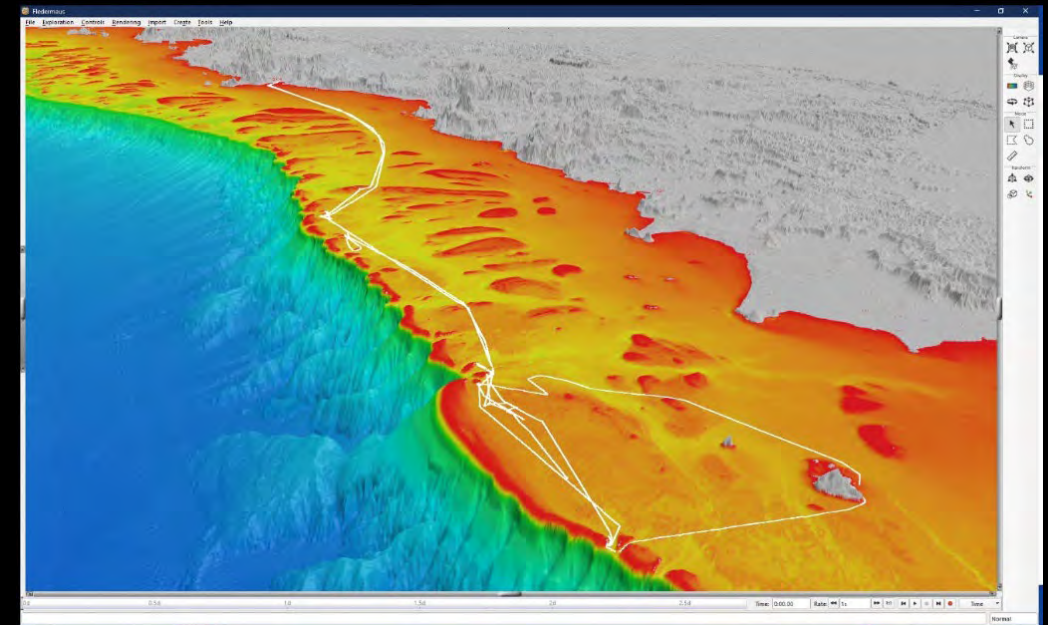
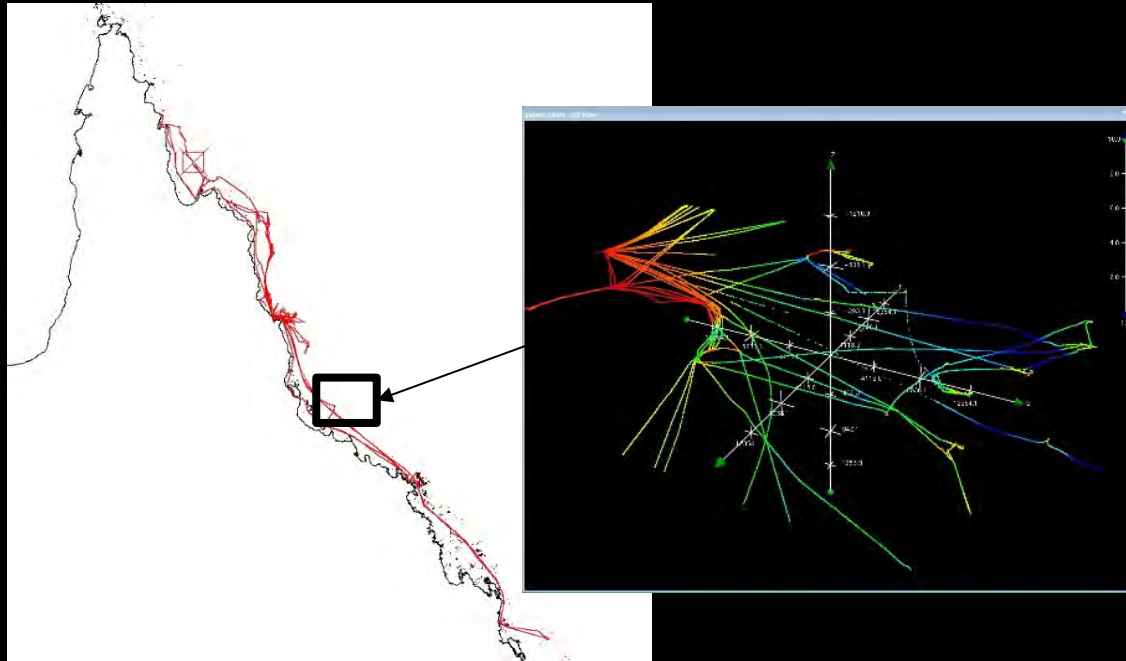
Python processing

- data logger stores .tsv files
- raw data are NMEA 0183 strings
- can have wrong dates, missing value
- Python filters RMC, DBT string values
- o/p lat,long,date,time,course,speed,depth
- report of errors, valid data points, % pass

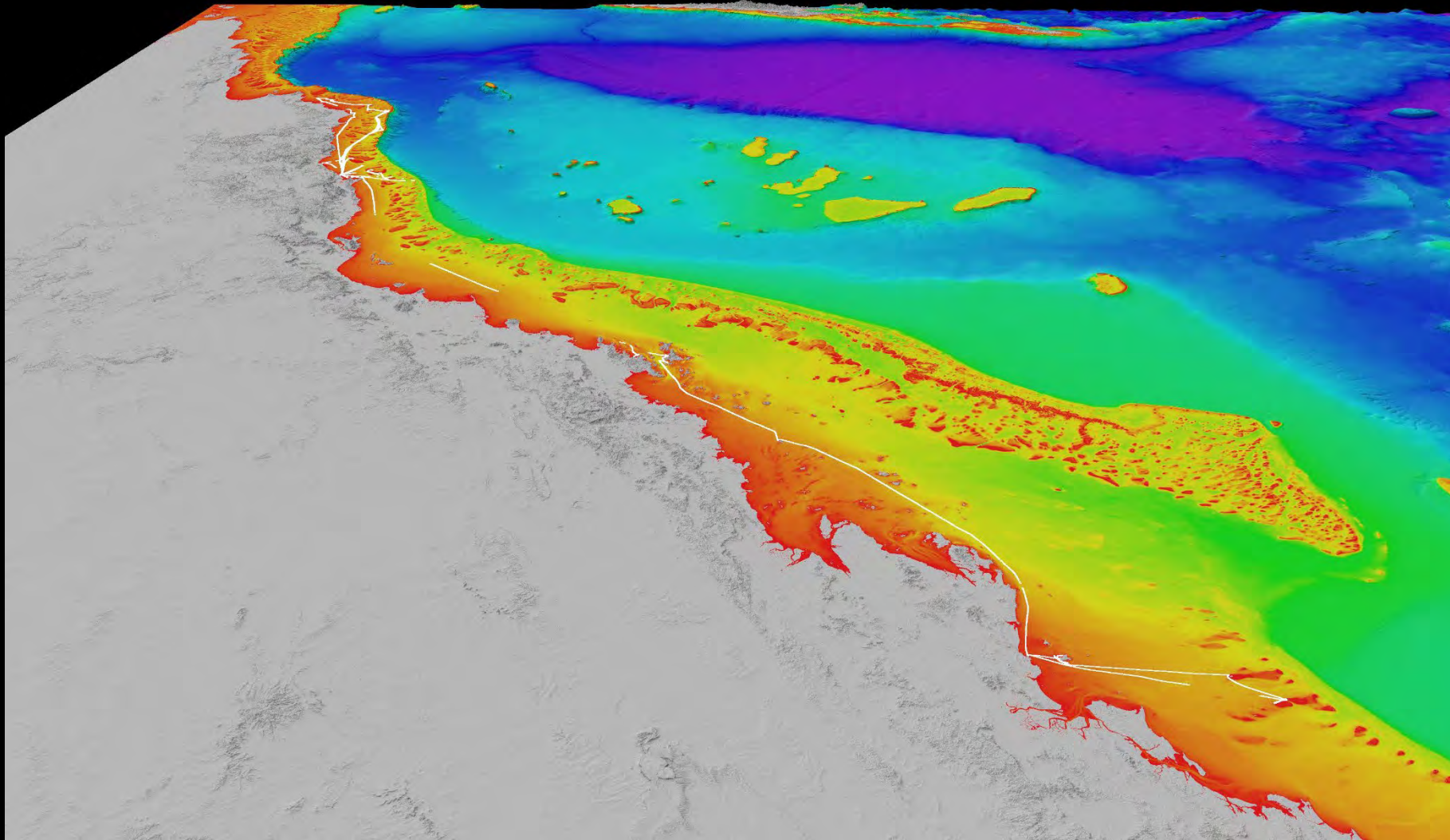


Spatial filter

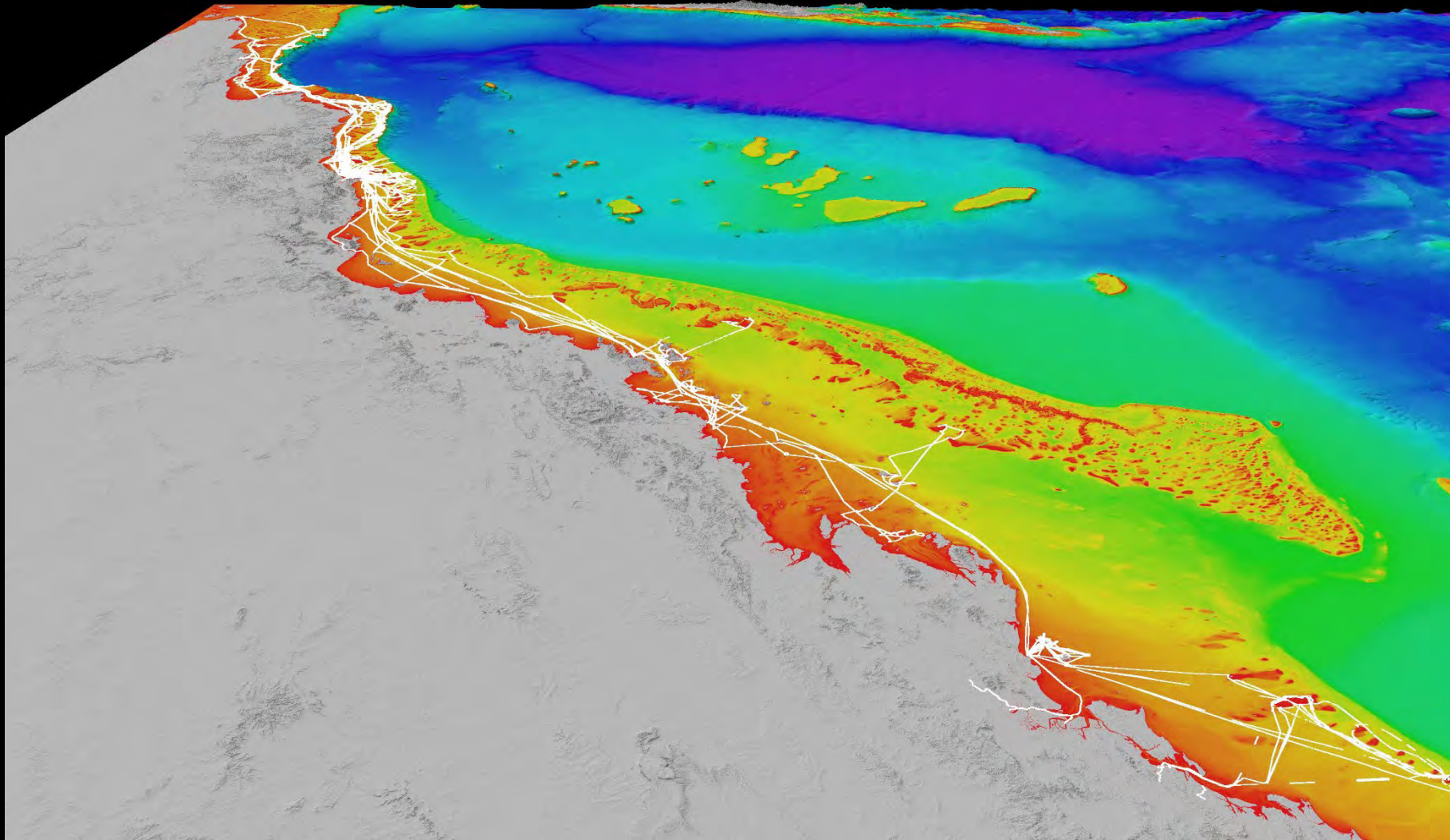
- import tables to visualisation software
- Fledermaus, HIPS, GIS, Google Earth
- ideally viewed as 3D point cloud
- filter and remove anomalous points
- very little noise, e.g. few 0 m values
- very few nav spikes (using raw GPS)



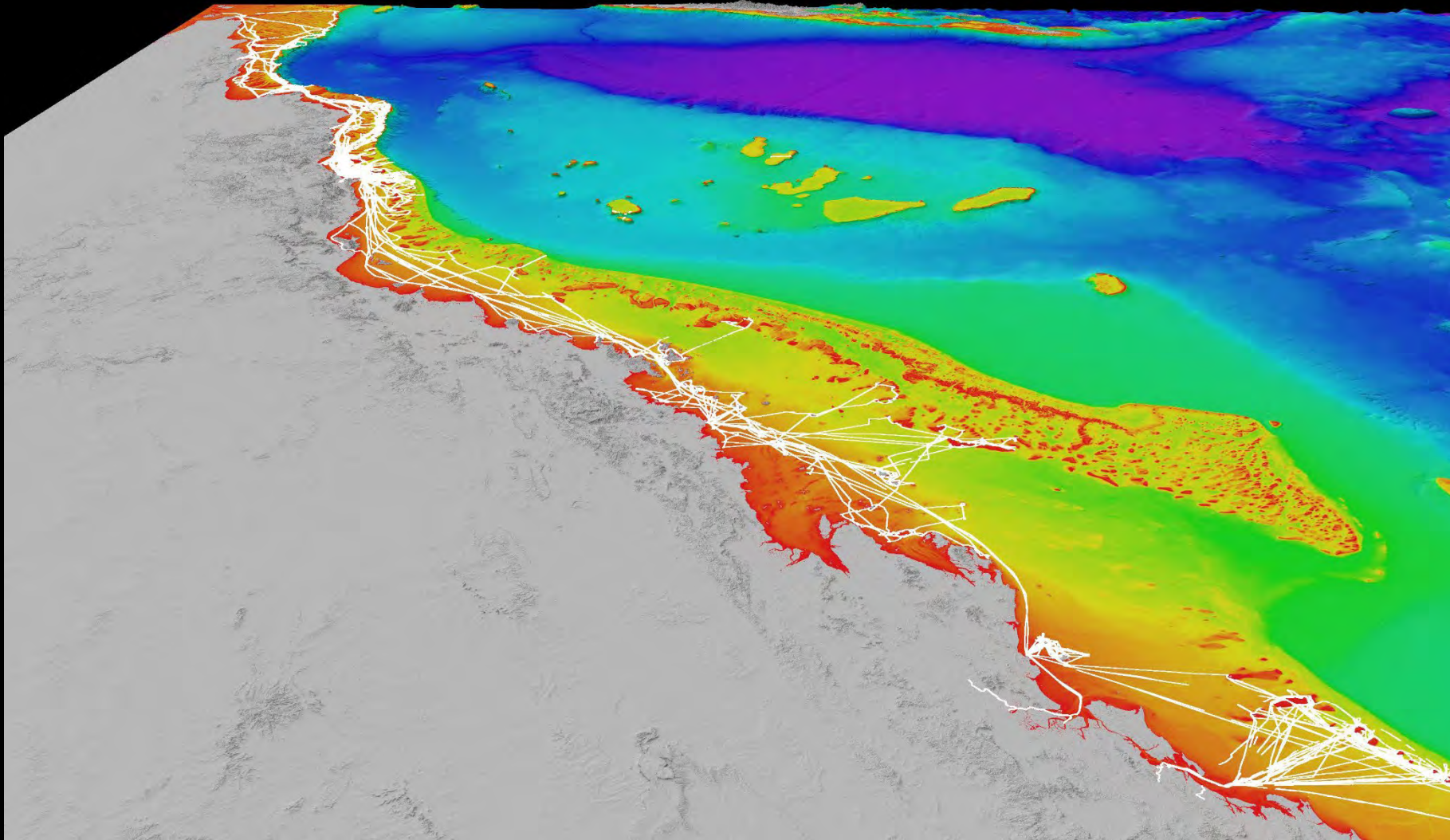
2018



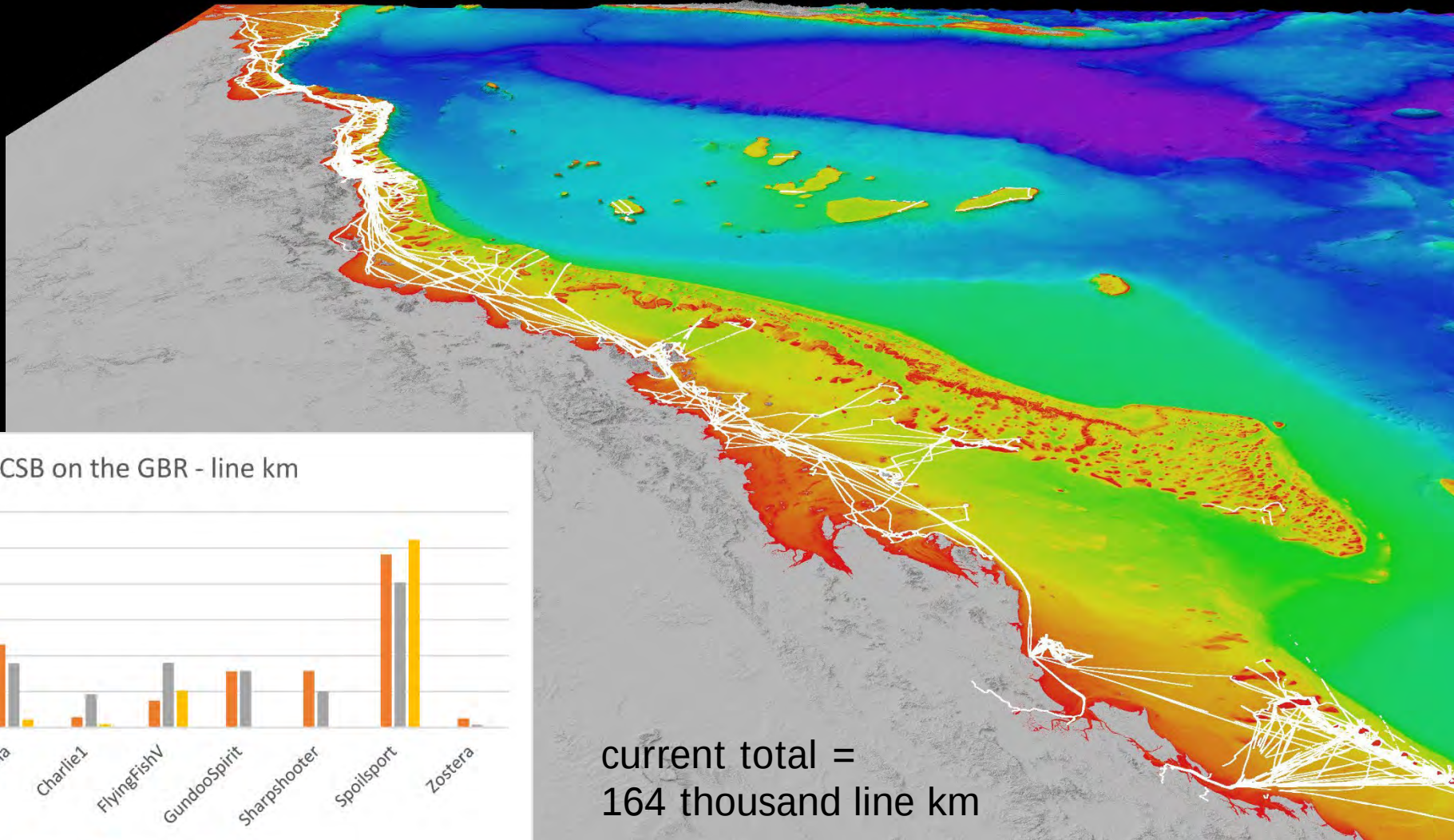
2018-2019



2018-2019-2020



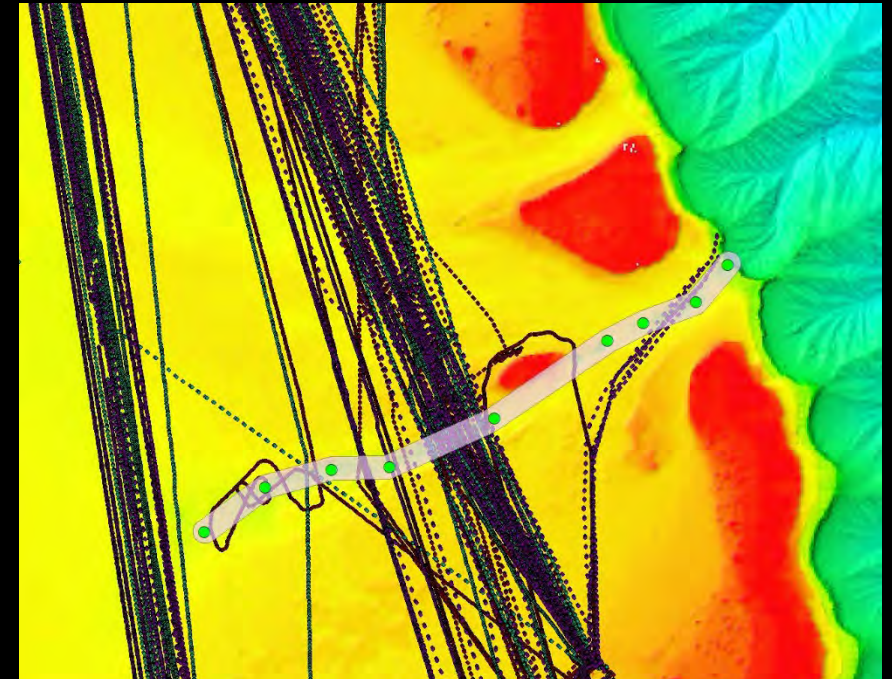
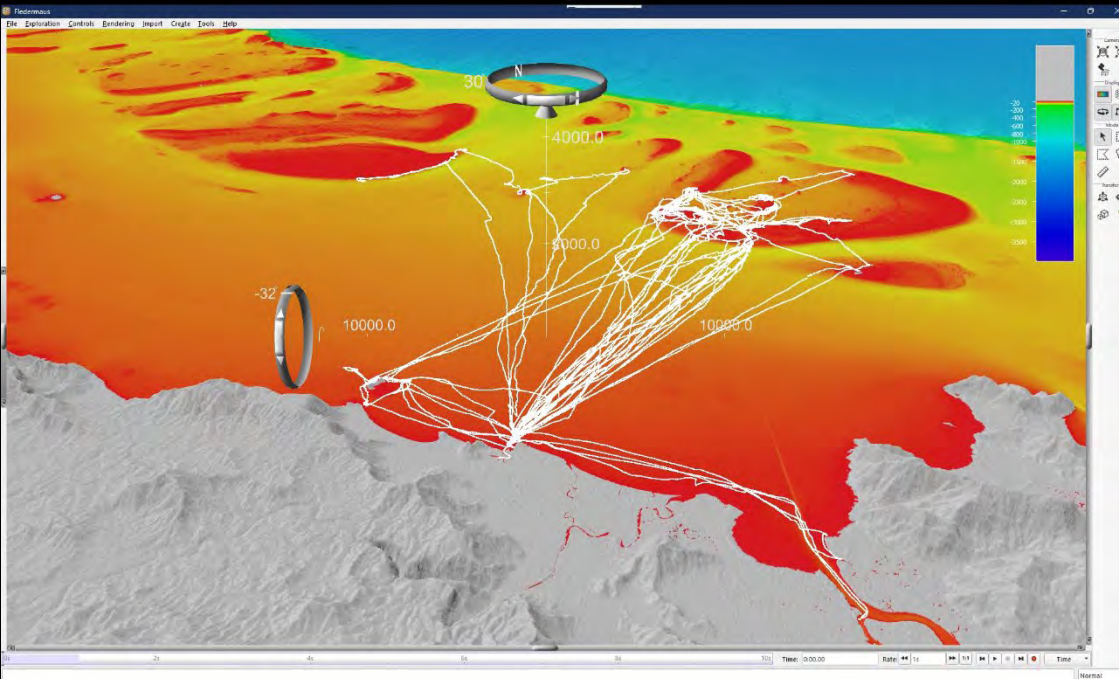
2018-2019-2020-2021



current total =
164 thousand line km

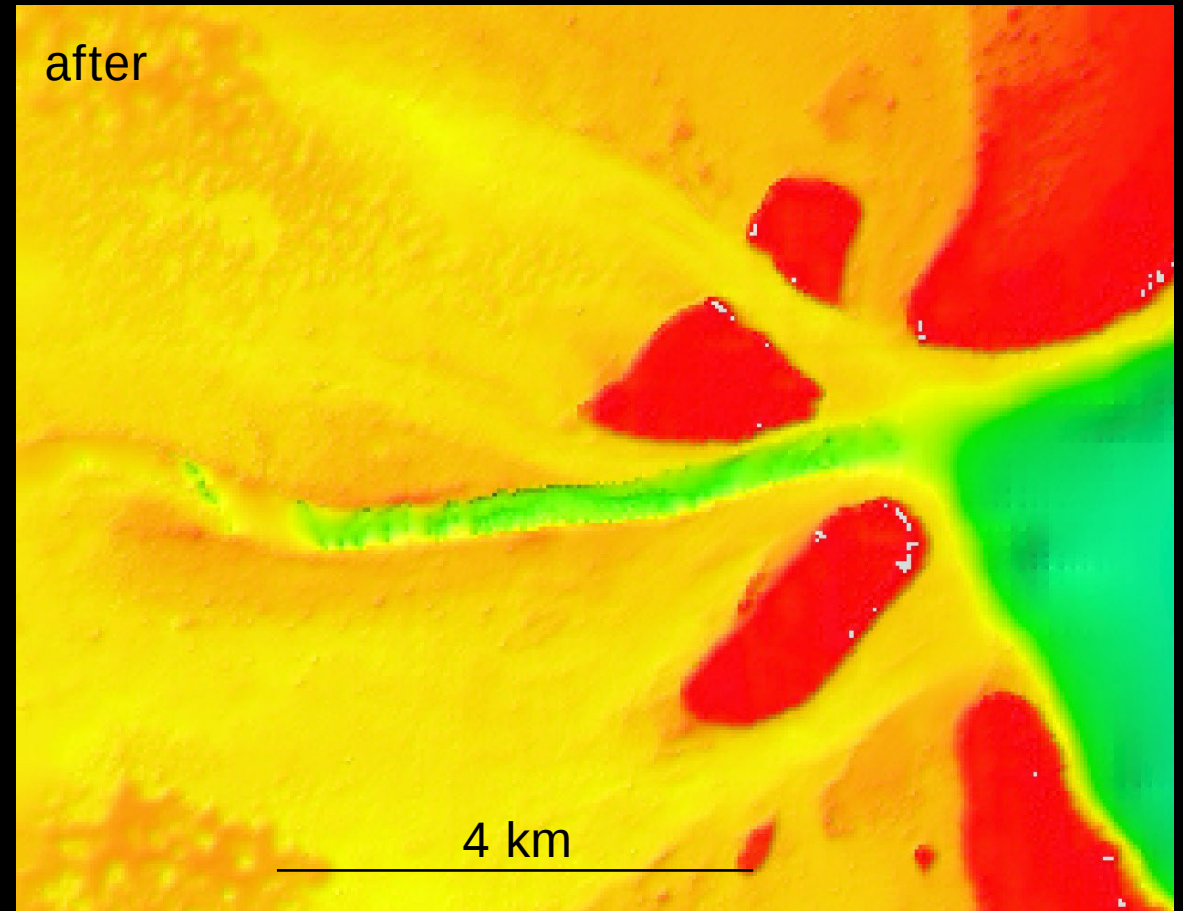
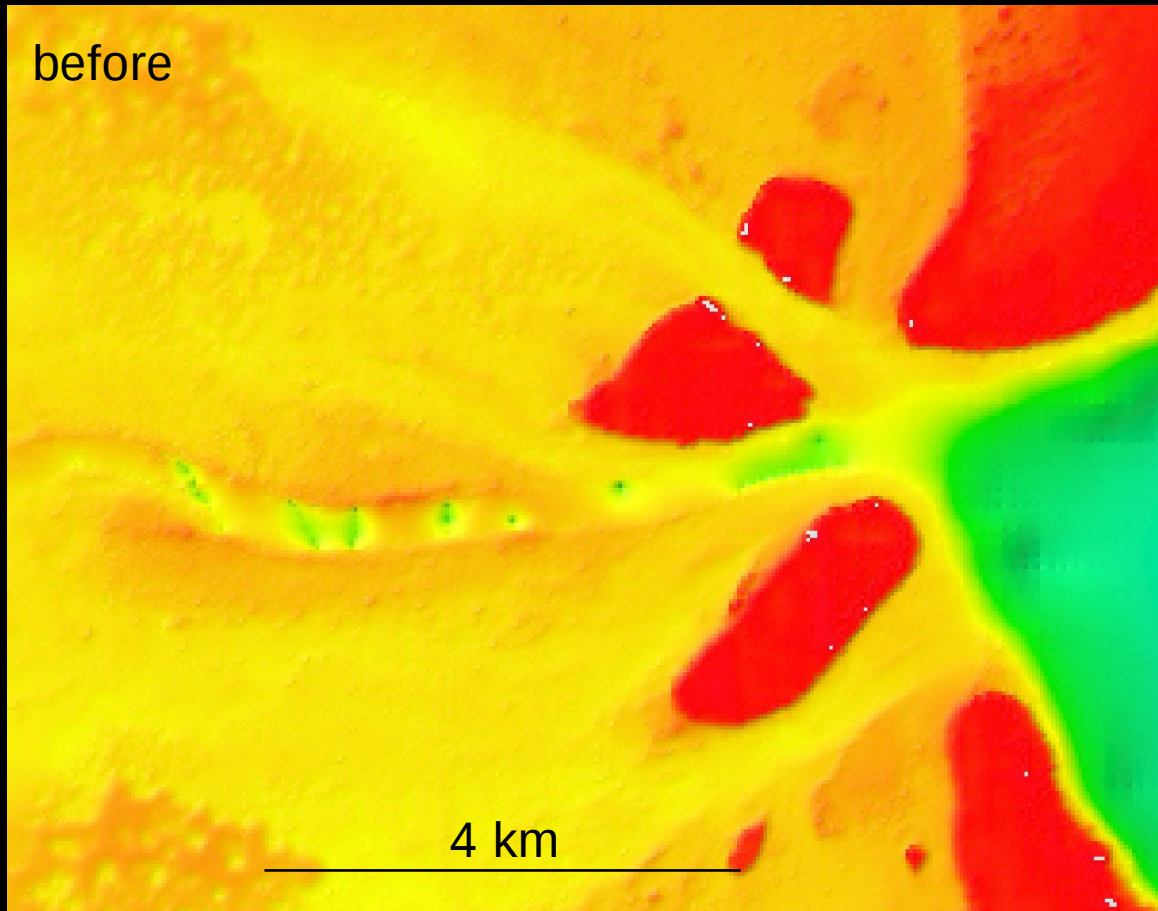
Feedback to volunteers

- ~3 monthly downloads by email or visits
- timely feedback is essential to volunteers
- build a relationship with volunteers
- can request dedicated transits
- e.g. GBR paleo-channel survey
- provide annual reports to volunteers



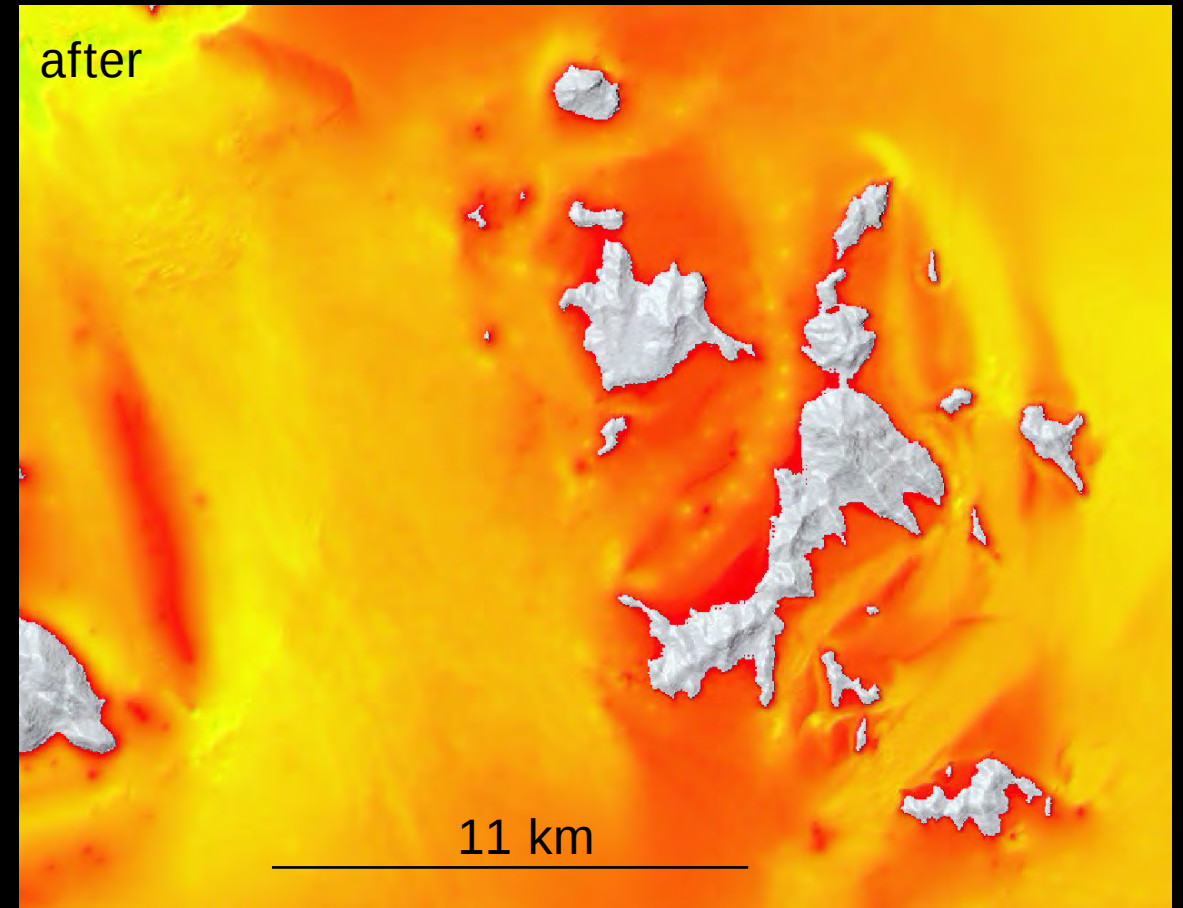
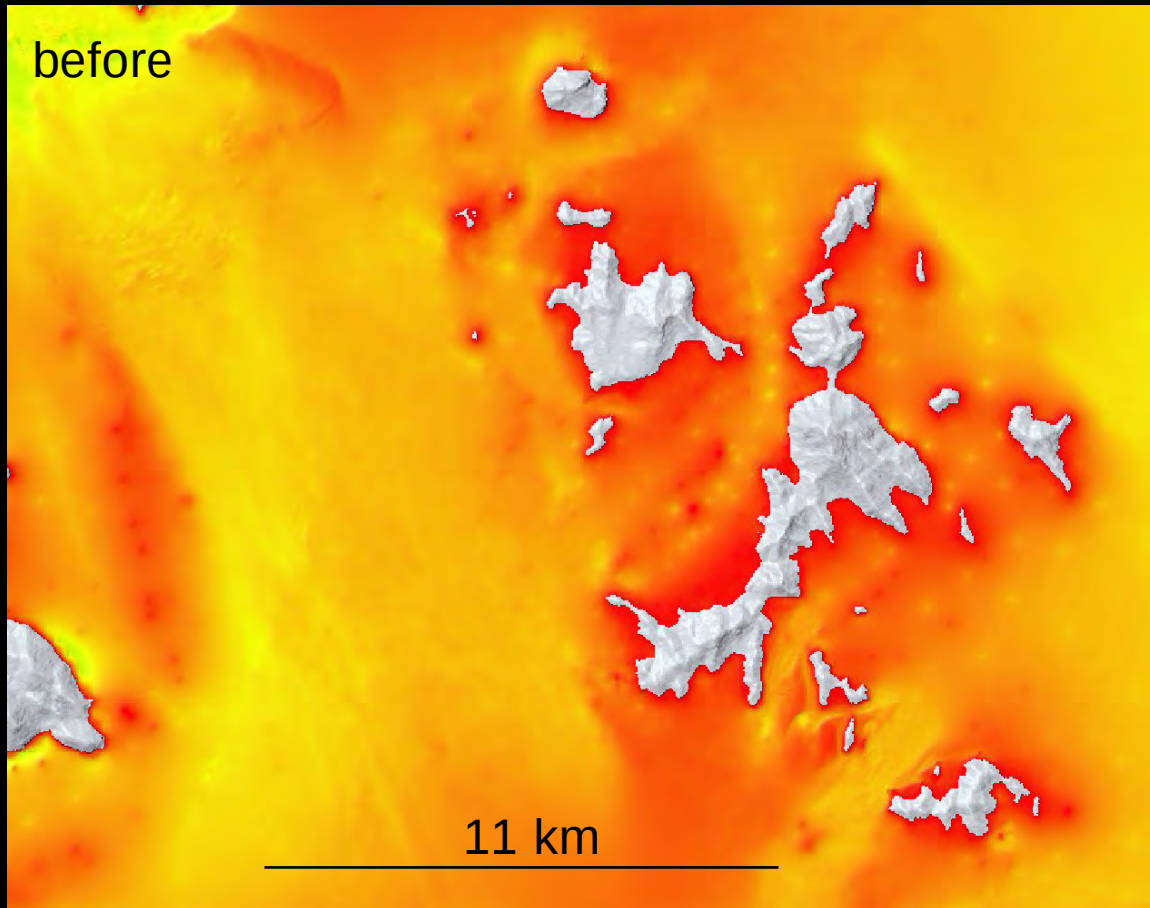
Making a difference

- Channel separating Ribbon Reefs No. 10 and 9

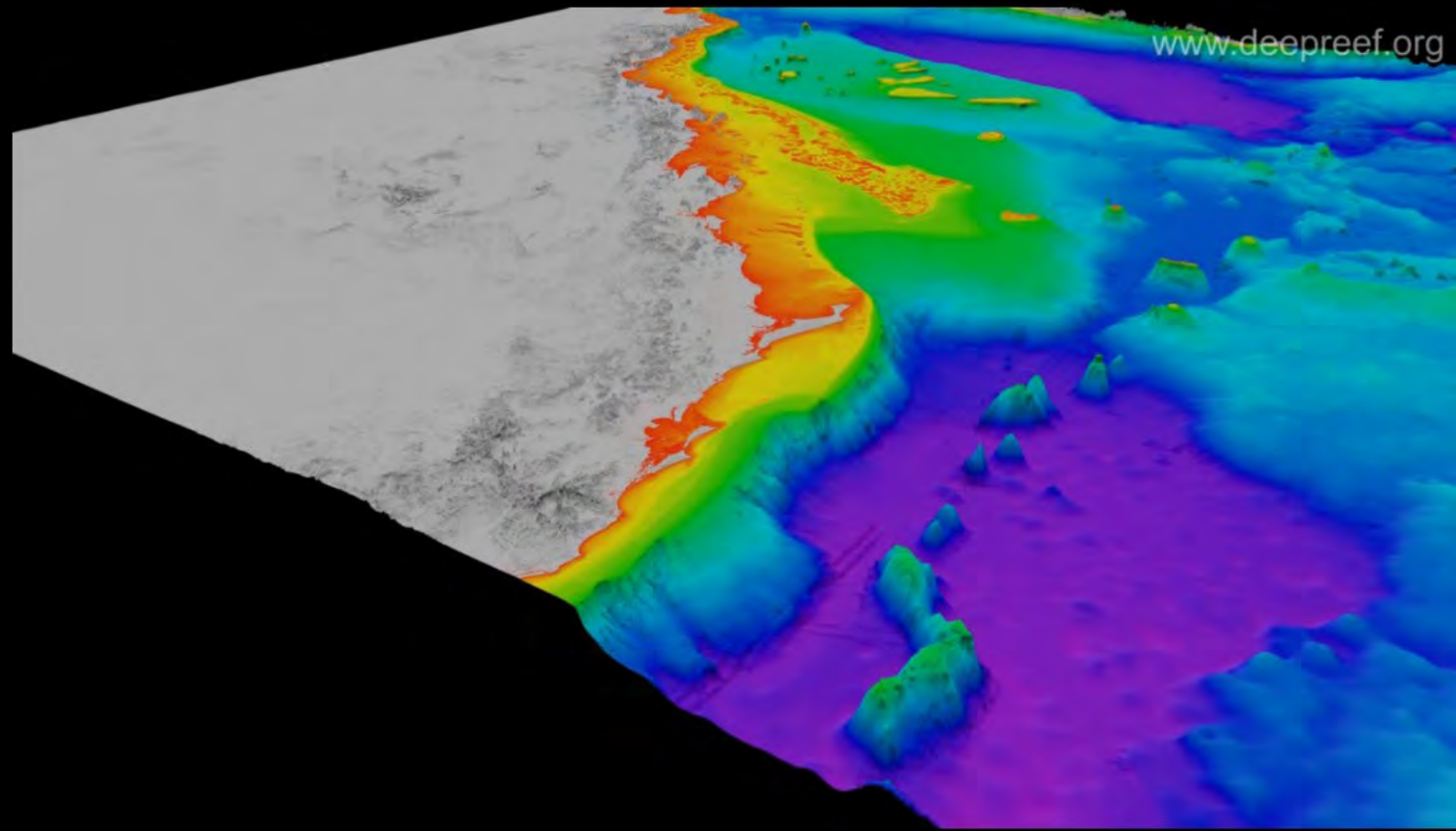


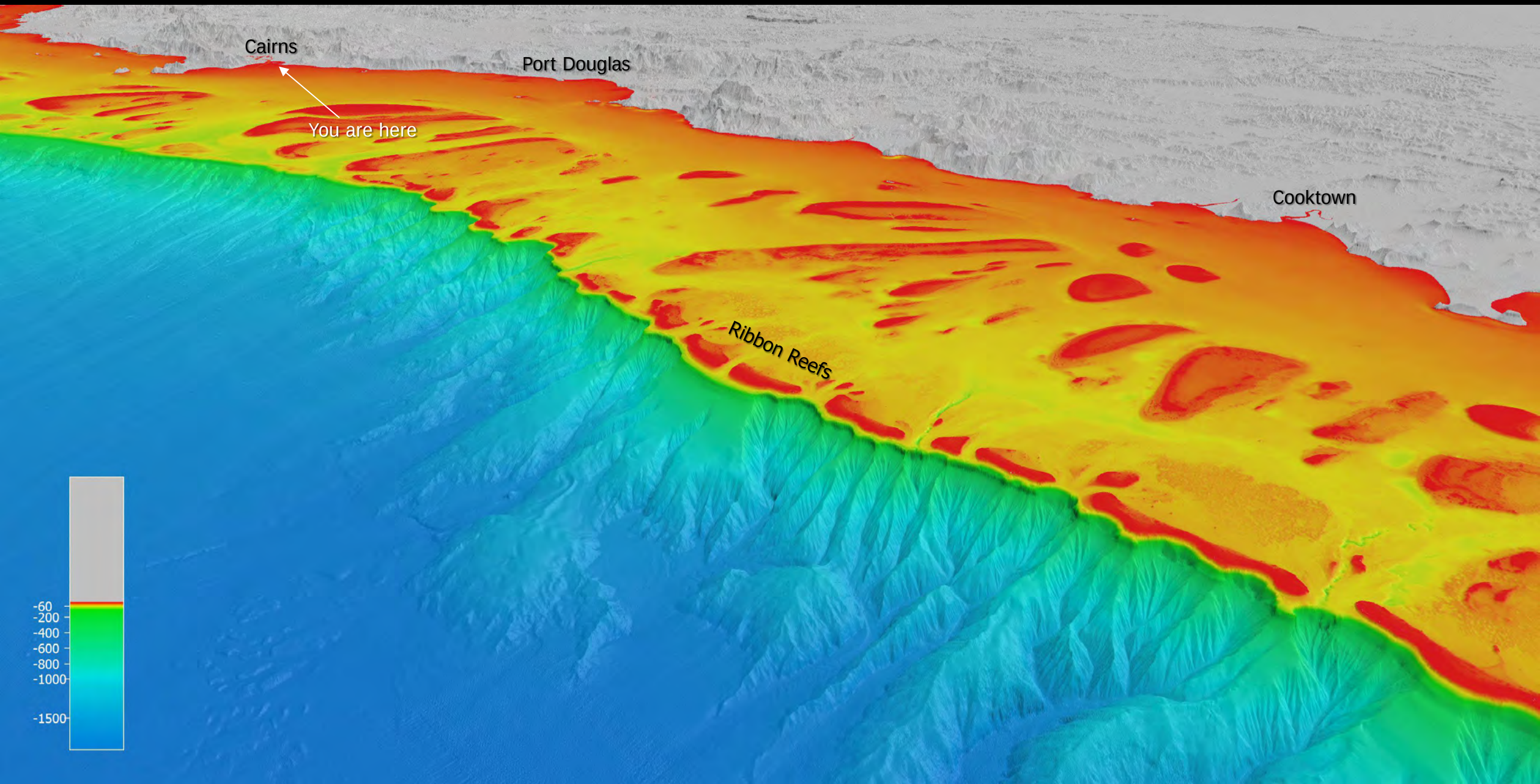
Making a difference

- Lindeman Islands



3D flythrough





Data delivery

JCU (Trusted Node)

3D surfaces of
integrated data

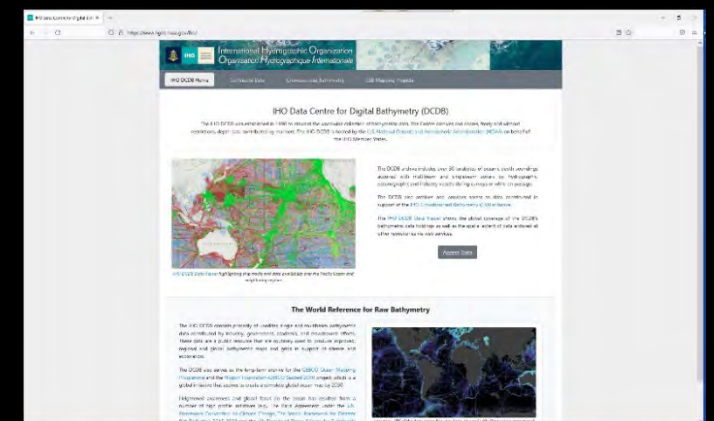
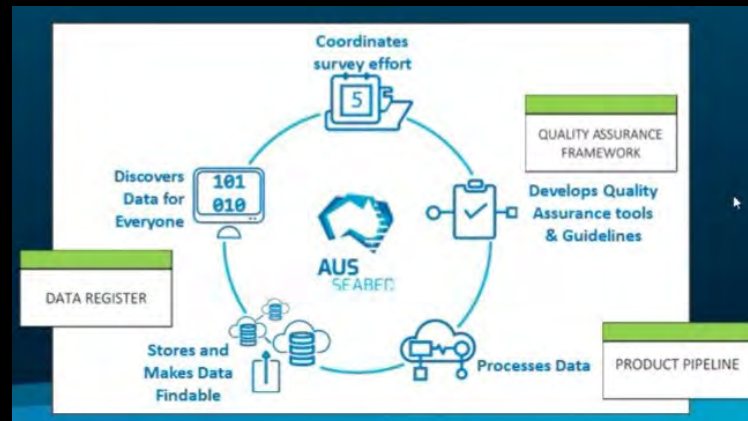
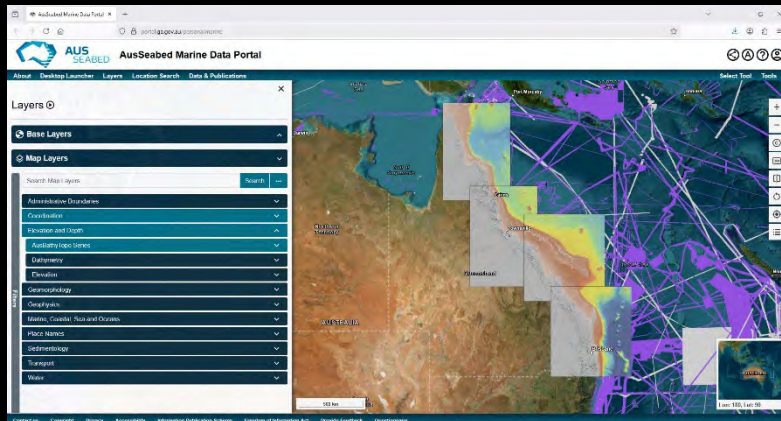
(pending) xyzt
bathy point data

(block by AHO) xyzt
bathy point data

AusSeabed Marine Data Portal

Marine Data Register

IHO Data Centre for Digital
Bathymetry (DCDB)



Future work

- Add more volunteer vessels to CSB on GBR project
- Continue improving 3D depth models for the GBR
- Upload xyzt point data to AusSeabed Marine Data Register
- Continue advising Australian efforts for acquiring CSB data