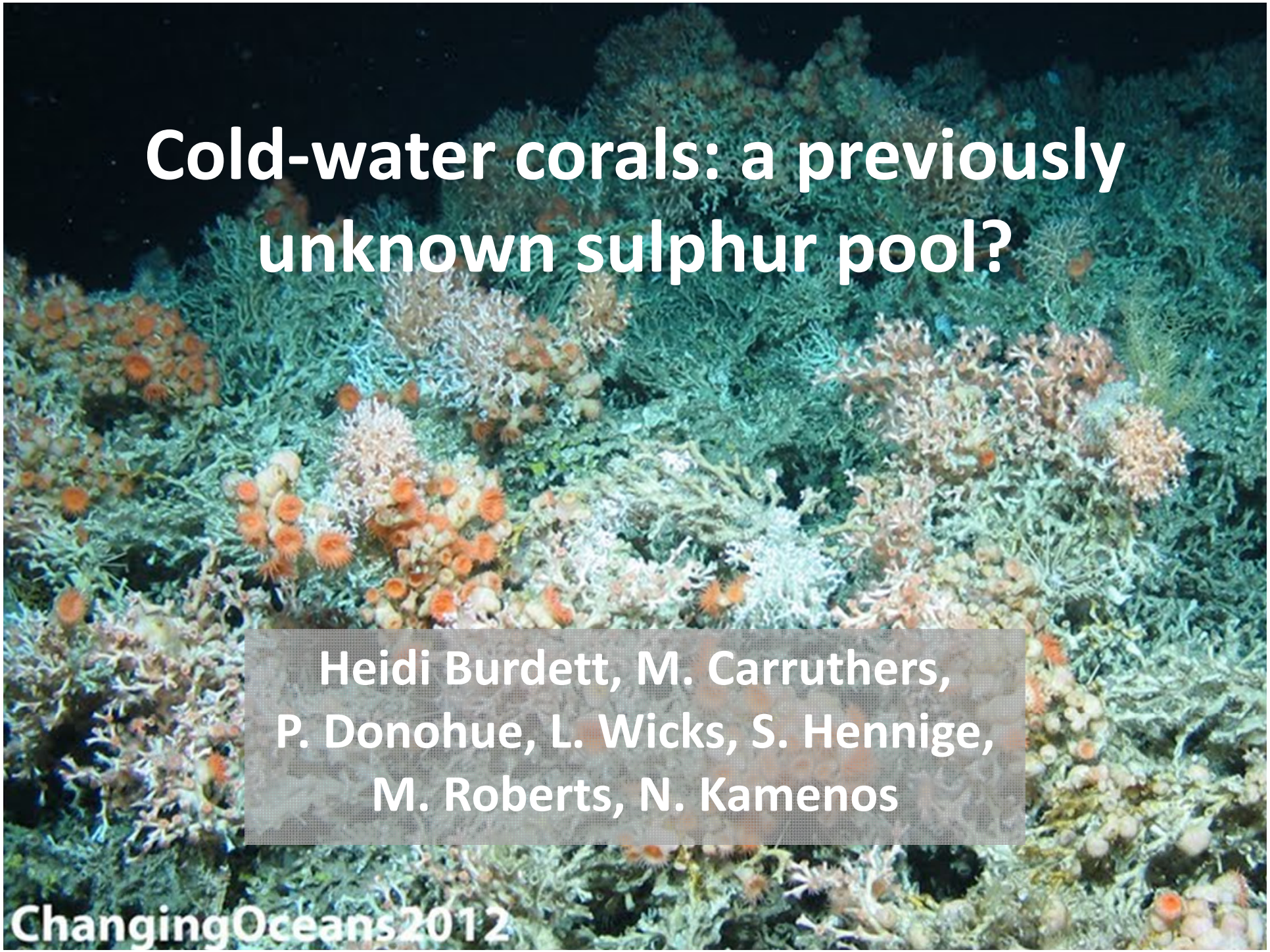
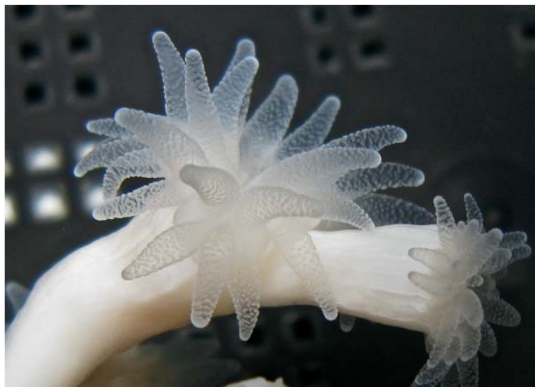

Cold-water corals: a previously unknown sulphur pool?
Heidi Burdett, M. Carruthers, P. Donohue, L. Wicks, S. Hennige, M. Roberts, N. Kamenos
ChangingOceans2012

Cold-water corals

- Scleractinian corals, just like tropical shallow-water corals
  - Aragonite skeleton
- Lacking in photosynthetic symbionts, so can live below the photic zone
  - Found in depths of 1000s of metres
- Thought to be highly susceptible to projected changes in ocean warming and acidification

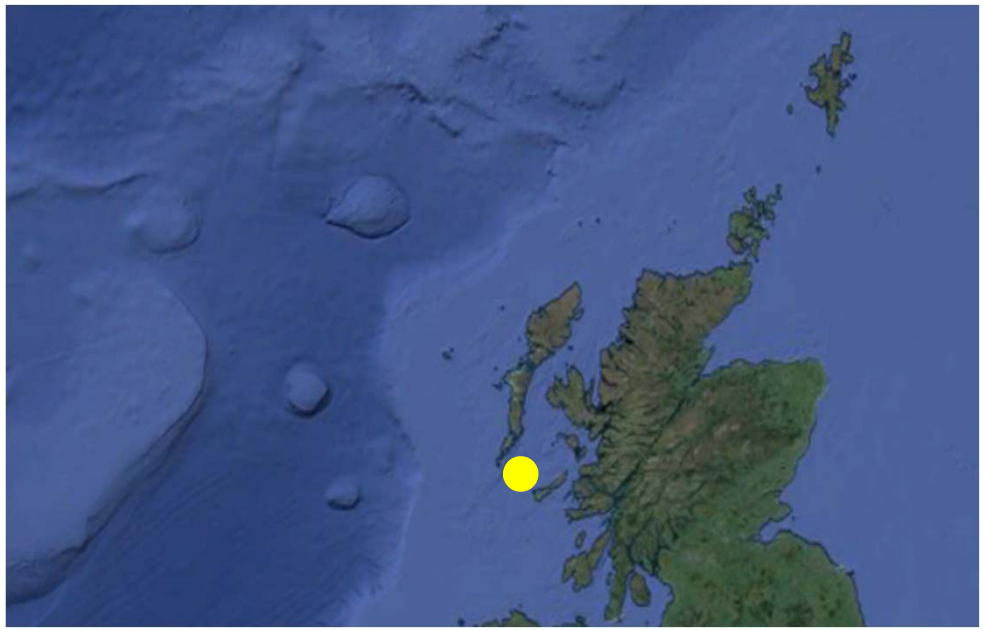


Biogenic marine sulphur

- Dimethylsulphide (DMS)
  - Linked to climate regulation feedback
  - Cue for invertebrate settlement & macrofaunal foraging
- Derived from dimethylsulphoniopropionate (DMSP)
  - Produced by most marine algae, and maybe corals!
  - Accumulated by invertebrates
  - Critical for ecosystem function

Changing Oceans Cruise, 2012

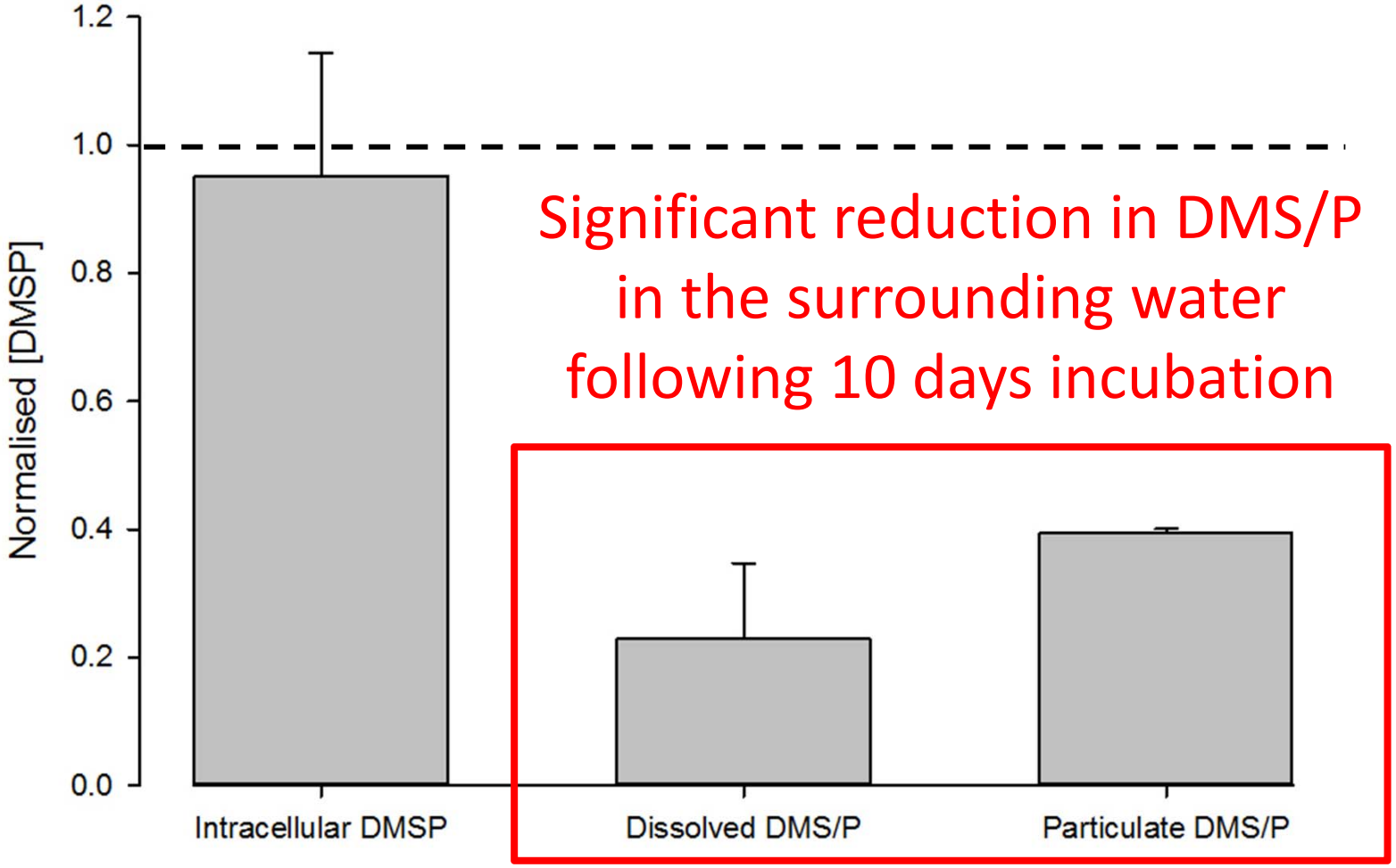
- Samples of *Lophelia pertusa* collected from the Mingulay Reef complex
- Tidal downwelling at Mingulay means there is a direct connection to surface productivity



Perturbation experiment

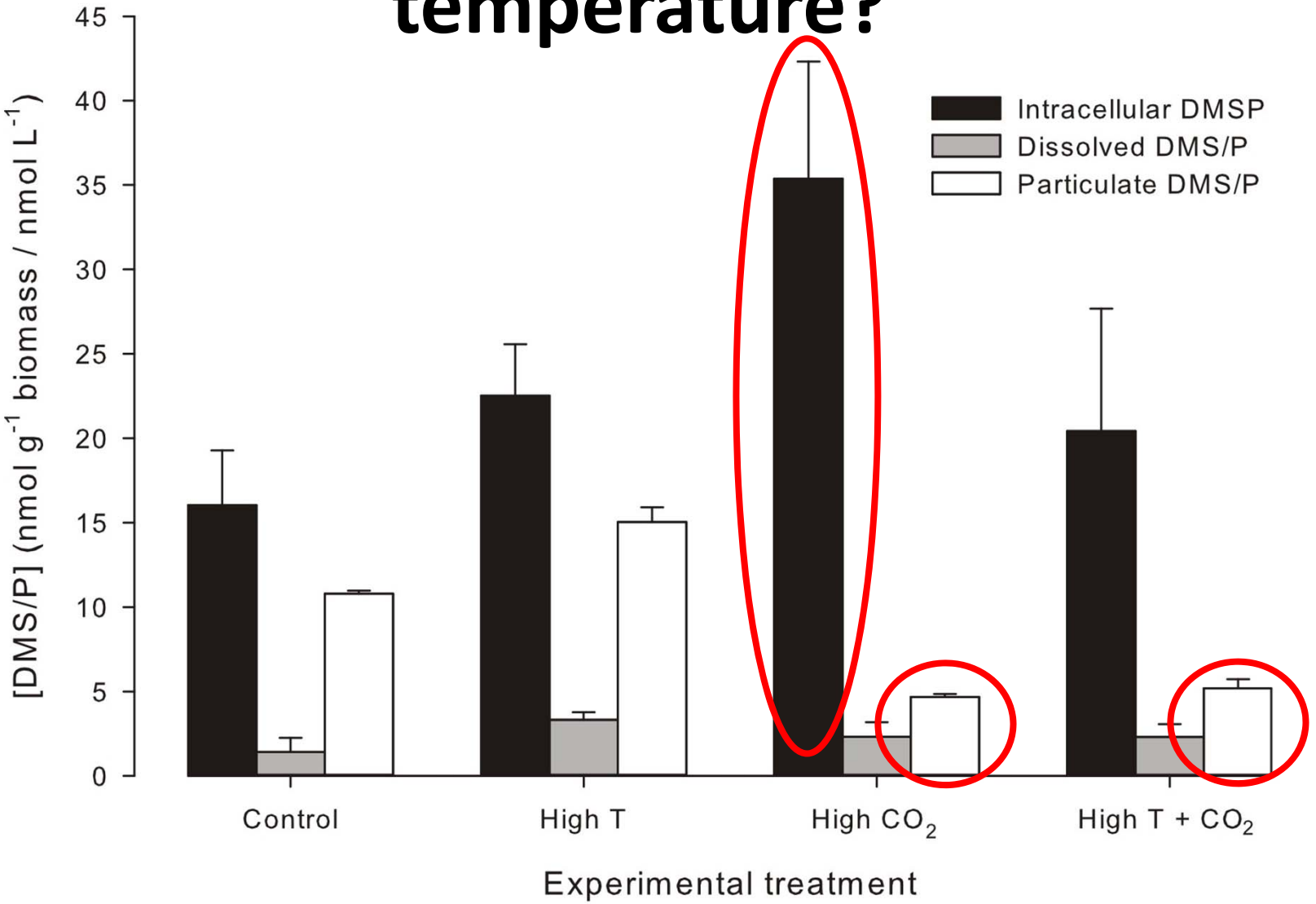
- Three treatments, plus control conditions:
  - High temperature: +3°C
  - High CO_2: ~800 ppm
  - Combined high temp / high CO_2
- Samples taken at the start and end of the experiment for:
  1. Intracellular DMSP
  2. Water column DMS+DMSP

Evidence of uptake and utilisation of DMSP by Lophelia?



Burdett et al. *Mar. Bio.* (2014)

CO_2-driven uptake, mediated by temperature?



Burdett et al. *Mar. Bio.* (2014)

Conclusions

- This is the first study to investigate DMSP in CWCs
- High concentrations!
- Likely to be nutritionally derived from the tidal downwellings
- Evidence that environmental conditions mediate uptake and / or utilisation

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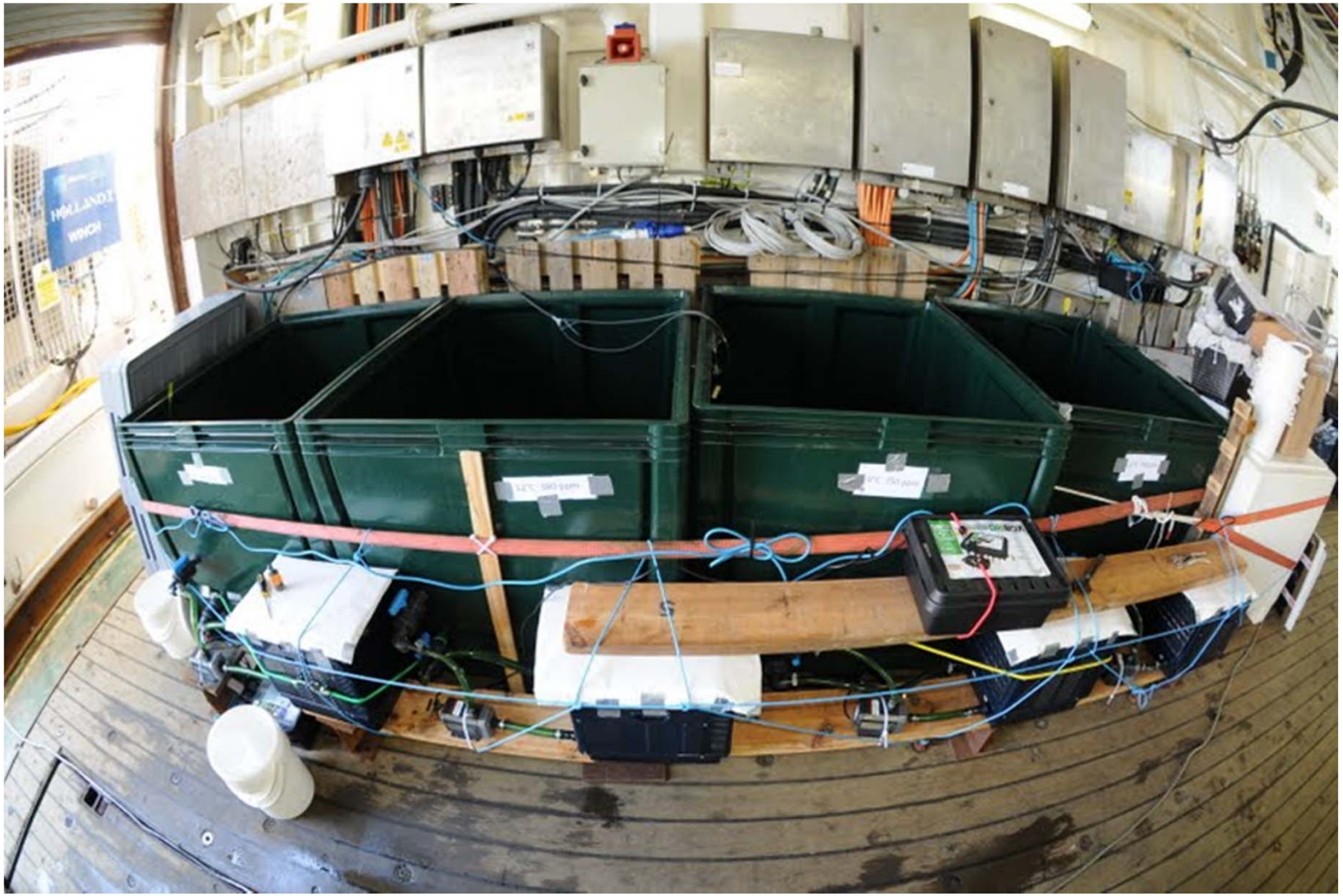
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