The Lofoten-Vesterålen ocean Observatory: Understanding behavioural response of benthic organisms from long term multi-sensor data

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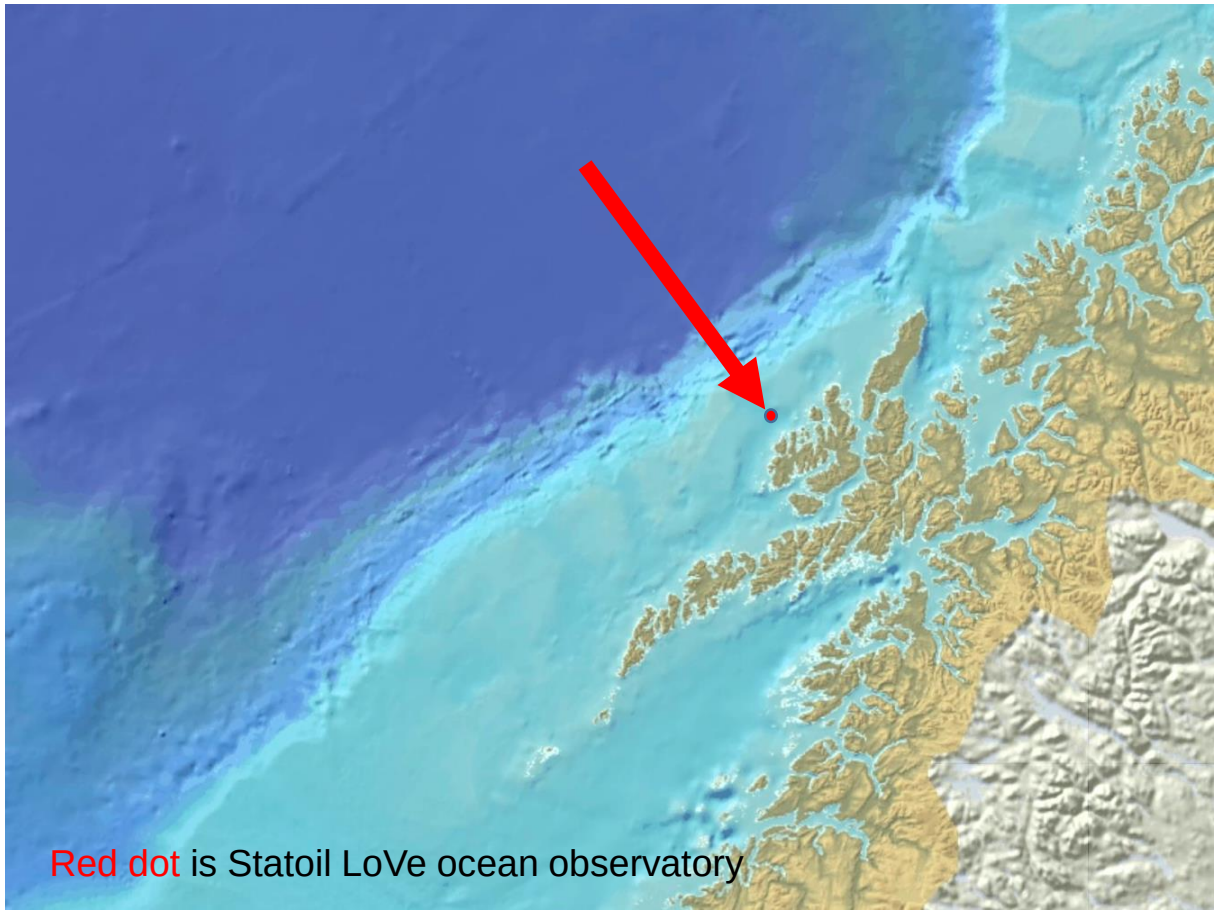
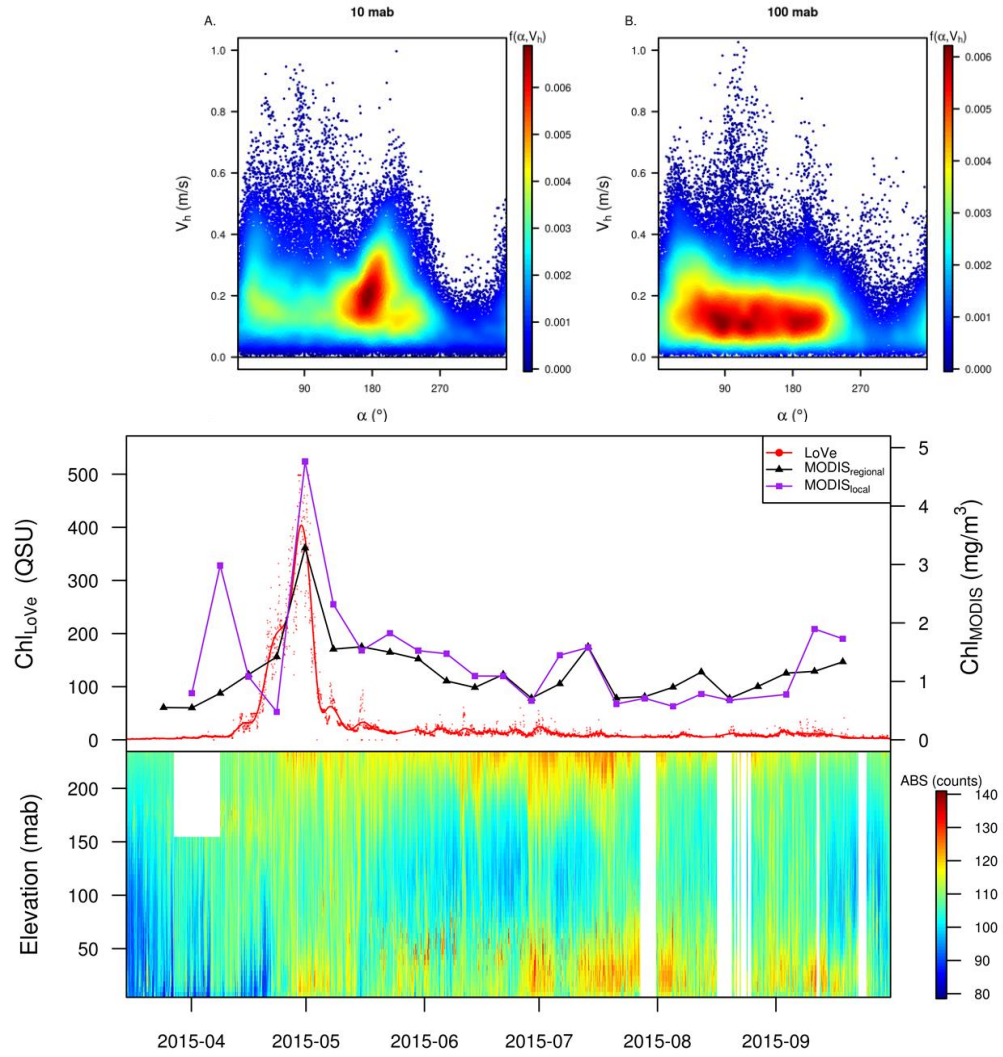
The LoVe area

- Important habitat for several species
  - Spawning ground
  - Corals
- The “gateway” to the Barents Sea
- Fisheries and tourism important sectors
- Not opened for Oil & Gas activity



Hydrodynamics

- Current following topography near the sea floor
  - Southward to Northeast
- Low net water movement
  - Mostly local production
- Spring bloom in April/May
- Zooplankton food source in summer
- Resuspension of sediments in winter



Engeland, T. van *et al.*, In prep. Food supply mechanisms to a cold-water coral reef on the Norwegian continental shelf revealed by continuous measurements from a cabled ocean observatory

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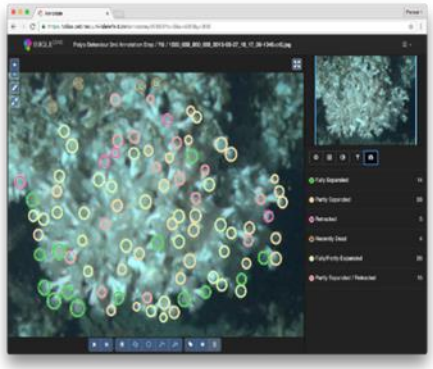
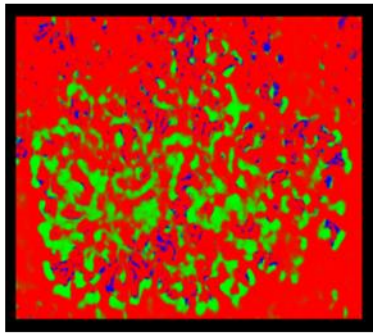
Behaviour

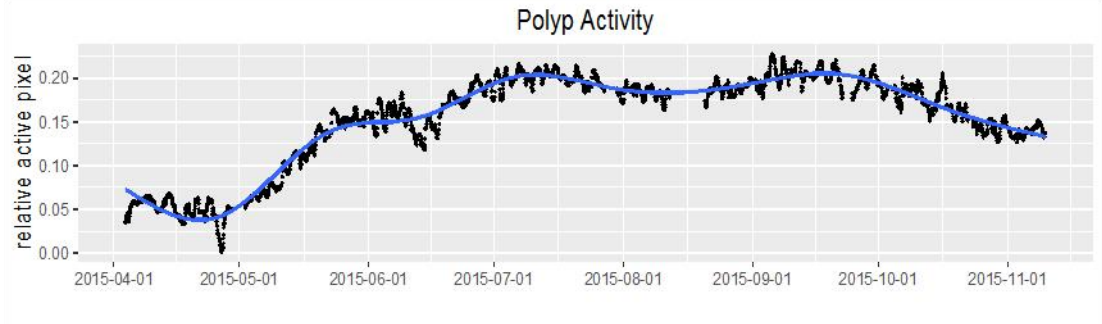


Computer Vision

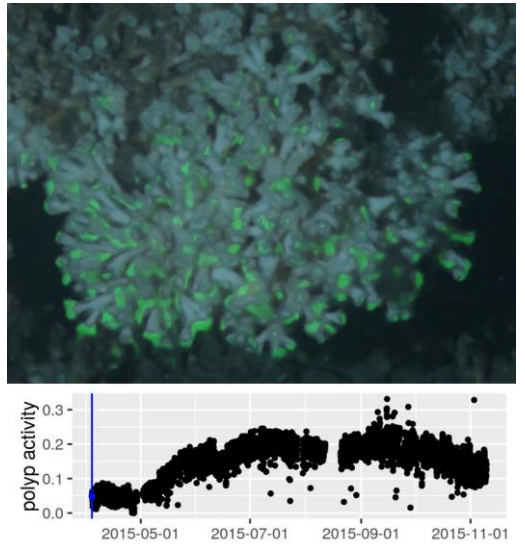


Lophelia pertusa polyp activity

- Algorithm for automatic detection developed based on manual labelling
- Images converted to numerical values



Osterloff, J., Nilssen, I., Järnegren, J., Buhl-Mortensen, P., Nattkemper, T. W., 2016. Polyp activity estimation and monitoring for cold water corals with a deep learning approach. 2016 ICPR 2nd Workshop on Computer Vision for Analysis of Underwater Imagery (CVAUI)



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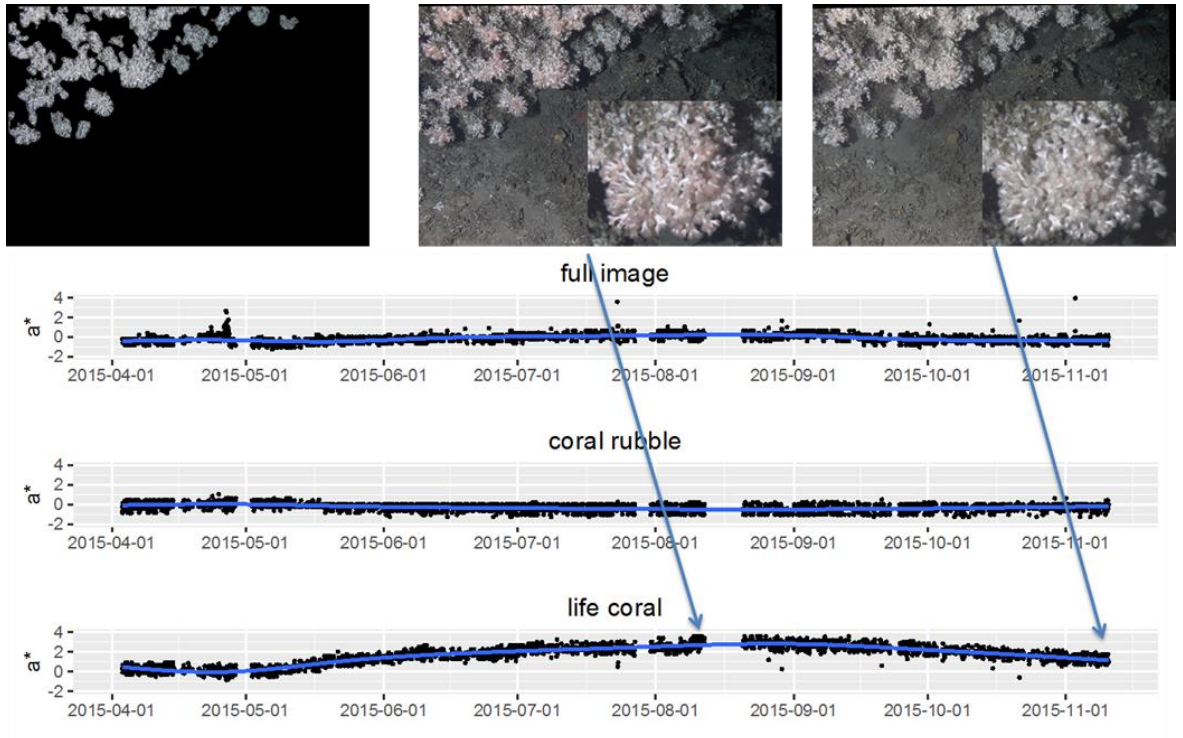
Behaviour

Lophelia pertusa Colour change

- Algorithm for automatic segmentation of live corals
- Extraction of normalized coral colour and quantification of change



Osterloff, J., Nilssen, I., Nattkemper, T. W., 2016b. Computational coral feature monitoring for the fixed underwater observatory LoVe. OCEANS 2016 MTS/IEEE Monterey. pp 1-5, doi: 10.1109/OCEANS.2016.7761417

Möller, T., Nilssen, I., Nattkemper, T. W., 2016. Data-driven long term change analysis in marine observatory image streams. 2016 ICPR 2nd Workshop on Computer Vision for Analysis of Underwater Imagery (CVAUI)

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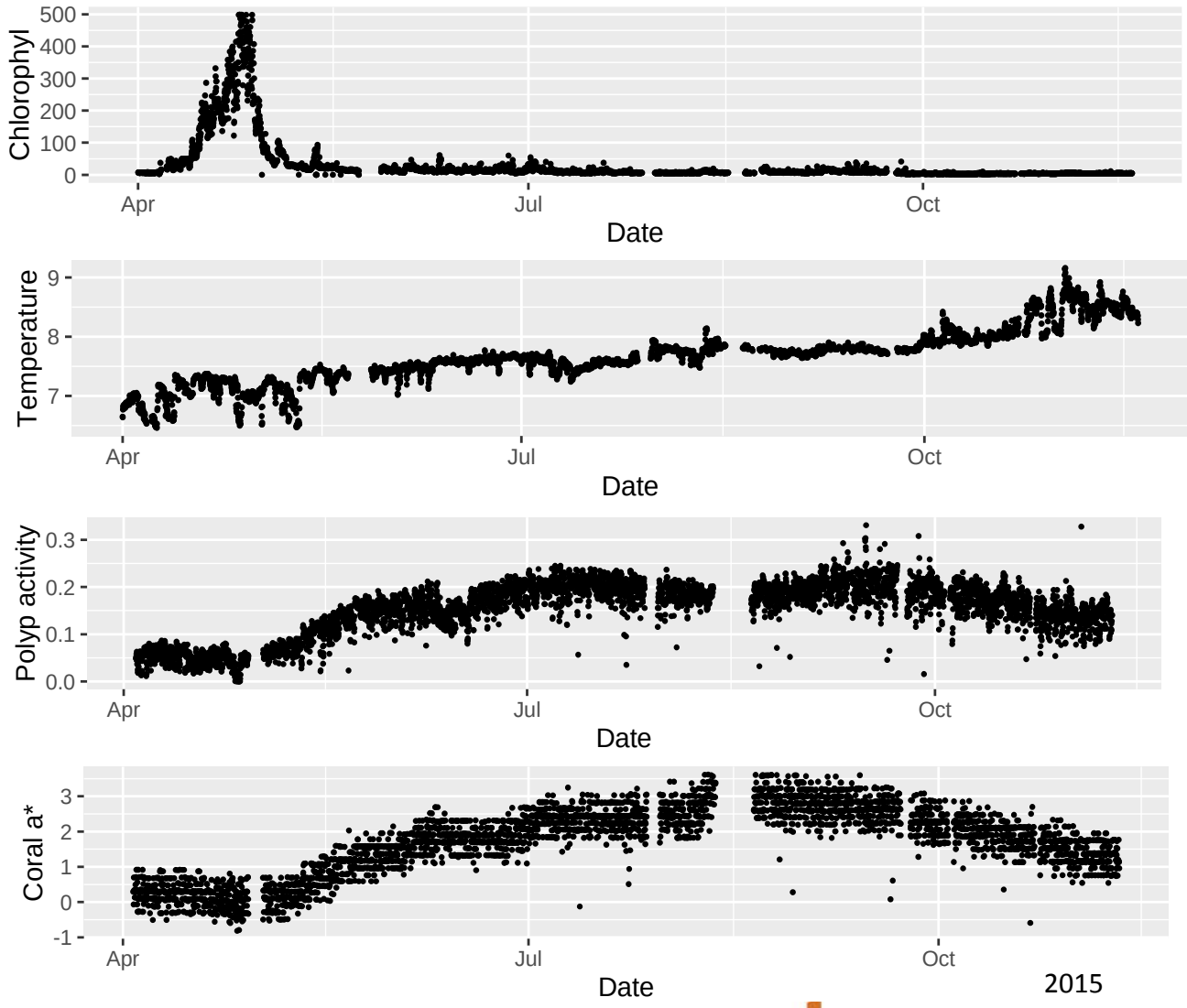
Preliminary results

Combining images with multisensory-data

- On the long scale



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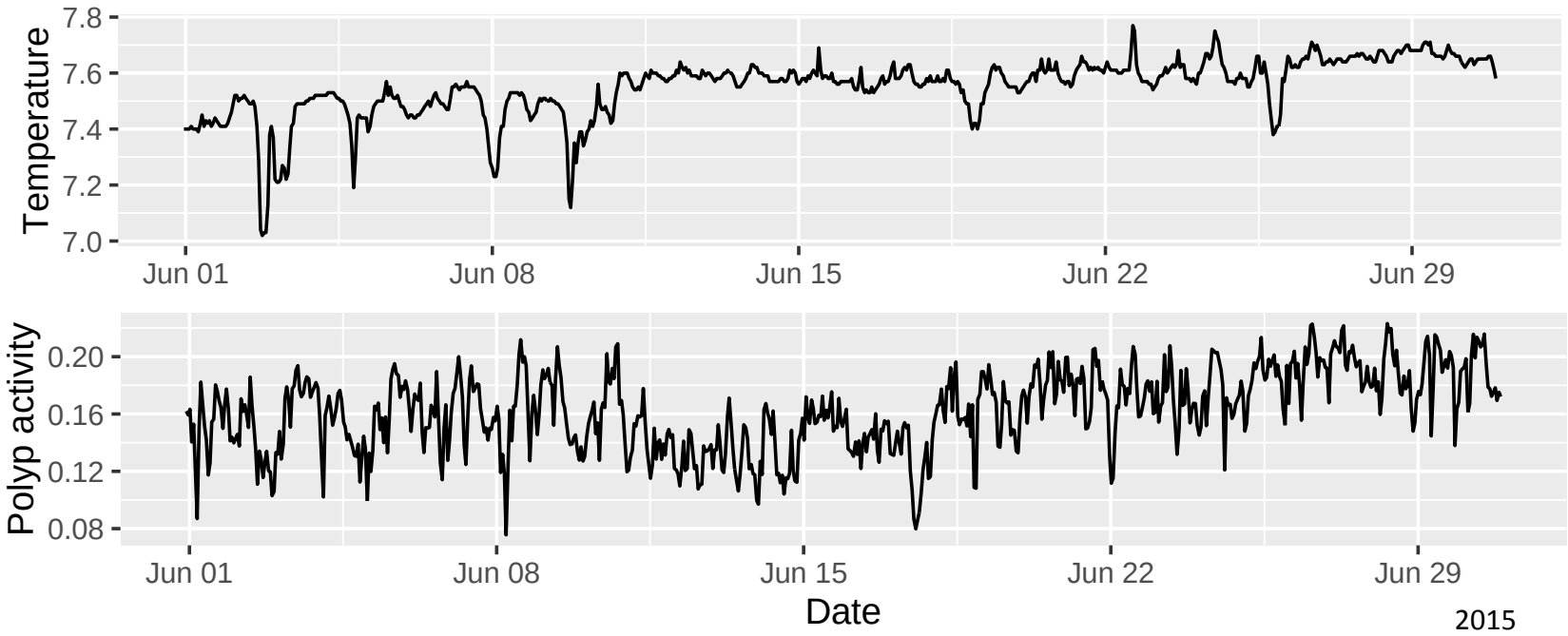
Preliminary results

Combining images with multisensory-data

- On the short scale



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Thank You!

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Image credit: BGS

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