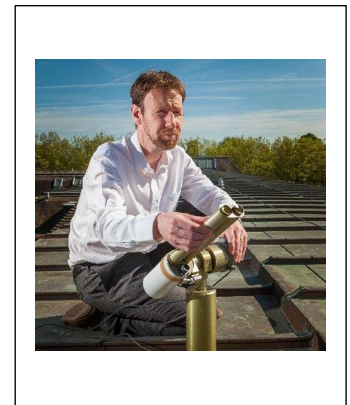## Session : Remote sensing for sustainable coastal zone management

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Improving our understanding of coastal zone dynamics with satellite data

Demand for marine data is continuously increasing, driven by a large expansion in the maritime economies of Europe and developing nations. Offshore renewable energy is the fastest-growing sector, increasing in size by more than 10% per year. To better understand the impacts of human activity on the offshore environment as well as the coastal zone, maximum use must be made of satellite remote sensing as this is the only technique which offers repeated, wide-area monitoring of the sea surface at low cost. The successful start of Copernicus and its fleet of Sentinel satellites now provide a wealth of imaging possibilities for the blue economy, once the challenges of downloading, storing, visualising and extracting information from its huge data volumes have been met. This talk will cover the use of Sentinel imagery in scientific research, education and community engagement using examples from the east coast of the UK. Examples will be shown of the tracking of long-term shifts in suspended sediment concentration and water clarity in the North Sea using Copernicus Marine Environmental Monitoring Service products. Detailed interactions of offshore wind farms with their surrounding waters are shown using Sentinel-2 images and in situ data, and for the estuaries of The Wash and Humber, a community-led ecosystem services mapping

exercise will be described. Finally, the challenges of providing a seamless satellite-based environmental service will be addressed, using latest developments in the Datacube Cube Services for Copernicus H2020 project (dcs4cop.eu).

Keynote's short bio

I am a marine biologist by training, and my work uses sensors, satellites and models to understand the patterns and processes which control marine ecosystems, particularly the primary production of phytoplankton, microphytobenthos and seaweeds. Much of my work work is applied ecology - working with industry and government to understand, use and protect our seas.

References

Capuzzo, E., Lynam, C. P., Barry, J., Stephens, D., Forster, R. M., Greenwood, N., McQuatters-Gollop, A., Silva, T., van Leeuwen, S. M. and Engelhard, G. H. (2018) 'A decline in primary production in the North Sea over 25 years, associated with reductions in zooplankton abundance and fish stock recruitment', *Global Change Biology*, 24(1), pp. e352–e364. doi: 10.1111/gcb.13916.

Ford, D. A., van der Molen, J., Hyder, K., Bacon, J., Barciela, R., Creach, V., McEwan, R., Ruardij, P. and Forster, R. (2017) 'Observing and modelling phytoplankton community structure in the North Sea', *Biogeosciences*. Copernicus GmbH, 14(6), pp. 1419–1444. doi: 10.5194/bg-14-1419-2017.

Lawrenz, E., Silsbe, G., Capuzzo, E., Ylöstalo, P., Forster, R. M., Simis, S. G. H., Prášil, O., Kromkamp, J. C., Hickman, A. E., Moore, C. M., Forget, M.-H., Geider, R. J. and Suggett, D. J. (2013) 'Predicting the Electron Requirement for Carbon Fixation in Seas and Oceans', *PLoS ONE*. Edited by L. J. Stal. Public Library of Science, 8(3), p. e58137. doi: 10.1371/journal.pone.0058137.

Roach, M., Cohen, M., Forster, R., Revill, A. S. and Johnson, M. (2018) 'The effects of temporary exclusion of activity due to wind farm construction on a lobster (Homarus gammarus) fishery suggests a potential management approach', *ICES Journal of Marine Science*. doi: 10.1093/icesjms/fsy006.