Monitoring and ming bio-physical parameters for hypoxia hazard in a coastal sand pit - DTU Orbit (17/12/2018)

Monitoring and ming bio-physical parameters for hypoxia hazard in a coastal sand pit

Management of coastal areas requires monitoring and modeling of the anthropogenic drivers and the bio-physical processes affecting water quality. To assess the range of hydrographic conditions controlling oxygen distribution in the bottom layers of sand pits, a multi-year oceanographic survey has been conducted in a coastal area with several extraction pits. Hydrographic data including profiles of temperature, salinity and oxygen were collected and related to local wind conditions and circulation. Moreover, 1D and 3D high-resolution non-hydrostatic ocean models were used to describe turbulent mixing regimes and to obtain the range of wind speeds for which the critical anoxic conditions may occur. It is shown that wind speed appears to control the dynamics of oxygen concentrations, with oxygen depleted zones developing in a short time in low wind speed conditions. Moreover, the depth and the shape of the extraction pit contribute to decrease the mixing of the bottom layers and increase the water retention in the hole increasing the output and the persistence of oxygen depleted zones in the excavated area. The results of the numerical simulations show that the risk of hypoxia at the bottom of the sand pits is associated with higher temperatures and wind speed lower than 5 m/s, which is not infrequent during the summer season. However, the number of consecutive days of oxygen depletion can be considered lower than the danger threshold level assumed in the literature.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Oceans and Arctic, Section for Coastal Ecology, Section for Ecosystem based Marine Management, University of Naples Parthenope, Marche Polytechnic University
Contributors: Mariani, P., Benassai, G., Grieco, L., Stenberg, C., Støttrup, J. G.
Publication date: 13 Mar 2018
Peer-reviewed: Yes

Publication information
Journal: Sustainability (Switzerland)
Volume: 10
Issue number: 3
Article number: 785
ISSN (Print): 2071-1050
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.37 SJR 0.537 SNIP 1.03
Web of Science (2017): Impact factor 2.075
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.96 SJR 0.548 SNIP 0.938
Web of Science (2016): Impact factor 1.789
Web of Science (2016): Indexed yes
Scopus rating (2015): CiteScore 1.78 SJR 0.482 SNIP 0.936
Web of Science (2015): Impact factor 1.343
Web of Science (2015): Indexed yes
Scopus rating (2014): CiteScore 1.52 SJR 0.501 SNIP 1.055
Web of Science (2014): Impact factor 0.942
Web of Science (2014): Indexed yes
Scopus rating (2013): CiteScore 1.43 SJR 0.521 SNIP 1.162
Web of Science (2013): Impact factor 1.077
ISI indexed (2013): ISI indexed no
Web of Science (2013): Indexed yes
Scopus rating (2012): CiteScore 1.18 SJR 0.463 SNIP 0.777
ISI indexed (2012): ISI indexed no
Scopus rating (2011): CiteScore 0.65 SJR 0.263 SNIP 0.495
ISI indexed (2011): ISI indexed no
Scopus rating (2010): SJR 0.152 SNIP 0.374
Original language: English
Keywords: Coastal environment, Field data, Hypoxia hazard, Numerical modeling, Sand pits