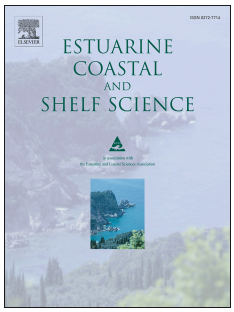
Accepted Manuscript



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PII: S0272-7714(16)30734-X

DOI: 10.1016/j.ecss.2016.12.007

Reference: YECSS 5337

To appear in: *Estuarine, Coastal and Shelf Science*

Received Date: 29 December 2015

Revised Date: 15 September 2016

Accepted Date: 17 December 2016

Please cite this article as: Zaborska, A., Kosakowska, A., Bełdowski, J., Bełdowska, M., Szubska, M., Walkusz-Miotk, J., Żak, A., Ciechanowicz, A., Wdowiak, M., The distribution of heavy metals and ^{137}Cs in the central part of the Polish maritime zone – An area selected for wind farm development., *Estuarine, Coastal and Shelf Science* (2017), doi: 10.1016/j.ecss.2016.12.007.

The distribution of heavy metals and ^{137}Cs in the central part of the Polish maritime zone – an area selected for wind farm development.

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1. Introduction

Heavy metals are elements that occur naturally in the environment. Their natural concentrations are usually very low and vary between areas of different geological origin. Since the beginning of the industrial era (the industrial revolution at the end of 19th century) large loads of metals have been emitted to the environment due to intense human activity. Some heavy meals are very toxic (for example, Hg, Cd, Pb and As) even at low concentrations, and have no known beneficial biological effects. Heavy metals enter the environment during production (including mining and smelting), use (batteries, pigments, ceramics, plastics), recycling, combustion of fossil fuels (coal, former use of leaded gasoline), the use of mineral fertilizers and sewage sludge application, etc. (Szefer, 2002). Metals are transported to the marine environment in dissolved form and/or attached to particles via air masses (mainly Hg, Pb), rivers (Zn, Cu, Pb, As, Hg, Cd) and water currents (Schneider et al., 2000), coastal erosion (Bełdowska, 2015) and groundwater discharge (Szymczycha et al., 2014). Artificial radionuclides (eg. ^{137}Cs, ^{90}Sr, plutonium isotopes) in the Baltic Sea chiefly originate from atmospheric global deposition (nuclear explosions that were conducted mainly in the ‘60s and ‘70s) and the Chernobyl accident in 1986. Moreover, some radionuclides are discharged by an inflow of Atlantic water containing effluents from reprocessing plants (for example, La Hague and Sellafield) and from effluents of nuclear power plants in the Baltic Sea catchment (Zaborska et al., 2014).