

Long-term dispersion and availability of metals from submarine mine tailing disposal in a fjord in Arctic Norway - DTU Orbit (09/11/2017)

Long-term dispersion and availability of metals from submarine mine tailing disposal in a fjord in Arctic Norway

Mining of Cu took place in Kvalsund in the Arctic part of Norway in the 1970s, and mine tailings were discharged to the inner part of the fjord, Repparfjorden. Metal speciation analysis was used to assess the historical dispersion of metals as well as their potential bioavailability from the area of the mine tailing disposal. It was revealed that the dispersion of Ba, Cr, Ni, Pb and Zn from the mine tailings has been limited. Dispersion of Cu to the outer fjord has, however, occurred; the amounts released and dispersed from the mine tailing disposal area quantified to be 2.5-10 t, less than 5% of Cu in the original mine tailings. An estimated 80-390 t of Cu still remains in the disposal area from the surface to a depth of 16 cm. Metal partitioning showed that 56-95% of the Cu is bound in the potential bioavailable fractions (exchangeable, reducible and oxidisable) of the sediments, totalling approximately 70-340 t, with potential for continuous release to the pore water and re-precipitation in over- and underlying sediments. Surface sediments in the deposit area were affected by elevated Cu concentrations just above the probable effect level according to the Norwegian sediment quality criteria, with 50-80% Cu bound in the exchangeable, reducible and oxidisable fractions, potentially available for release to the water column and/or for uptake in benthic organisms.

General information

State: Accepted/In press

Organisations: Department of Civil Engineering, ARTEK, Section for Arctic Engineering and Sustainable Solutions, Akvaplan-niva AS, Technical University of Denmark, UiT The Arctic University of Norway

Authors: Pedersen, K. B. (Ekstern), Jensen, P. E. (Intern), Sternal, B. (Ekstern), Ottosen, L. M. (Intern), Henning, M. V. (Ekstern), Kudahl, M. M. (Ekstern), Junttila, J. (Ekstern), Skirbekk, K. (Ekstern), Frantzen, M. (Ekstern)

Publication date: 2017

Main Research Area: Technical/natural sciences

Publication information

Journal: Environmental Science and Pollution Research

ISSN (Print): 0944-1344

Ratings:

BFI (2017): BFI-level 1

Web of Science (2017): Indexed yes

BFI (2016): BFI-level 1

Scopus rating (2016): CiteScore 2.66 SJR 0.813 SNIP 1.048

Web of Science (2016): Indexed yes

BFI (2015): BFI-level 1

Scopus rating (2015): SJR 0.879 SNIP 1.02 CiteScore 2.5

Web of Science (2015): Indexed yes

BFI (2014): BFI-level 1

Scopus rating (2014): SJR 0.949 SNIP 1.178 CiteScore 2.57

Web of Science (2014): Indexed yes

BFI (2013): BFI-level 1

Scopus rating (2013): SJR 0.879 SNIP 1.163 CiteScore 2.34

ISI indexed (2013): ISI indexed yes

Web of Science (2013): Indexed yes

BFI (2012): BFI-level 1

Scopus rating (2012): SJR 1.017 SNIP 1.232 CiteScore 2.29

ISI indexed (2012): ISI indexed yes

Web of Science (2012): Indexed yes

BFI (2011): BFI-level 1

Scopus rating (2011): SJR 1.13 SNIP 1.1 CiteScore 2.3

ISI indexed (2011): ISI indexed yes

Web of Science (2011): Indexed yes

BFI (2010): BFI-level 1

Scopus rating (2010): SJR 1.084 SNIP 1.045

Web of Science (2010): Indexed yes

BFI (2009): BFI-level 1

Scopus rating (2009): SJR 1.022 SNIP 1.014

Web of Science (2009): Indexed yes

BFI (2008): BFI-level 1

Scopus rating (2008): SJR 0.925 SNIP 1.019

Web of Science (2008): Indexed yes

Scopus rating (2007): SJR 0.809 SNIP 0.993

Web of Science (2007): Indexed yes

Scopus rating (2006): SJR 0.446 SNIP 0.598

Scopus rating (2005): SJR 0.576 SNIP 0.952

Web of Science (2005): Indexed yes

Scopus rating (2004): SJR 0.781 SNIP 1.001

Web of Science (2004): Indexed yes

Scopus rating (2003): SJR 0.556 SNIP 0.75

Web of Science (2003): Indexed yes

Scopus rating (2002): SJR 0.606 SNIP 0.936

Scopus rating (2001): SJR 0.56 SNIP 0.633

Web of Science (2001): Indexed yes

Scopus rating (2000): SJR 0.692 SNIP 0.855

Scopus rating (1999): SJR 0.849 SNIP 0.953

Original language: English

Submarine mine tailing disposal, Metal partitioning, Heavy metals, Principal component analysis, Fjord sediments, Sequential extraction

DOIs:

10.1007/s11356-017-9276-y

Source: FindIt

Source-ID: 2370708192

Publication: Research - peer-review › Journal article – Annual report year: 2017