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Interactive comment on "CASCADE – The Circum-Arctic Sediment CArbon DatabasE" *by* Jannik Martens et al.

Anonymous Referee #2

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General Comments: Martens et al. present a new, openly accessible database called "CASCADE" compiling various data from surface sediments and sediment cores from the Arctic Ocean. Specifically, the database contains data on TN and TOC contents, carbon isotopic compositions of bulk organic matter (δ13C and Δ14C) and concentrations of terrigenous biomarkers (n-alkanes, n-alkanoic acids and lignin phenols). The authors combine existing data from different databases and even make previously inaccessible data available for the community. They also generate new data to fill regional gaps. At the end of the paper, they apply CASCADE to interpolate carbon concentrations and bulk 13C and bulk 14C data over the Arctic Ocean and discuss regional differences.

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Discussion paper

The paper and the database are clearly arranged and comprehensible. The data is easy to access as it is provided in common formats including text, excel and shape files. The quality standards and methods applied are state of the art and robust.

The database is a valuable piece of work and will be vital for Arctic research as it allows to comprehensively study biogeochemical processes and carbon cycling in the Arctic Ocean and how these processes are coupled to changes in the adjacent continents (e.g. permafrost thawing). Understanding these processes is crucial in a region expected to change drastically in the course of global warming. Altogether the database and paper stand already very well by themselves and do not need major editing. The paper can be published soon after a few small issues are addressed.

1) Overall the paper is well structured and easy to understand. However, it contains some rather long sentences that should be shortened to facilitate reading. Moreover, I found a few instances where the word order should be rearranged (see Specific Comments below) 2) Although the authors describe the file contents on the website and in the paper, I find it unhandy that the data files do not contain units in the column headers. The authors should consider to add the units to the files to make the work with the data even more comfortable for the user.

Specific comments: Line 43: change “shelves” to “Shelves”

Line 111: I think “13C/14C-isotope data” actually means δ13C and Δ14C data. This should be clearly stated as the term may be misunderstood as the isotopic ration between 13C and 14C.

Line 158: change to: “Here, surface sediments are defined as. . .”

Section 2.7.1: Does the gap filling concern surface sediments and cores?

Line 366: change to: towards remobilization in both, the current and over earlier. . ..

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2020.

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