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Earth System Science Data Discussions

Interactive comment on "Supraglacial dust and debris: geochemical compositions from glaciers in Svalbard, southern Norway, Nepal and New Zealand" *by* K. A. Casey

Anonymous Referee #2

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The manuscript by K.A. Casey describes a new data set about measurements of geochemical components in dust and debris taken at four different glaciers. These glaciers are located in Svalbard, southern Norway, Nepal, and New Zealand and should therefore represent four different glacier types with the following characteristics.

- The Svalbard glaciers are located in a mild polar climate with high rates precipitation in close proximity to the ocean, where marine aerosols are emitted.
- The Norway temperate and marine glaciers also receive high accumulations rates but are located "in" the downdraft path from industrialized regions of the northern European Union.

- The Nepal glaciers are the highest elevated glaciers in this study and are subject to a continental climate with enhanced summer accumulation. In contrast to the others these glaciers receive also a considerable amount of dust and debris load.
- The New Zealand glaciers at the outer flanks of the stratovolcano Mt. Ruapehu are subject to high precipitation rates in a temperate marine climate and to aerosols from the adjacent volcano and acidic crater lake.

The manuscripts informs after the introduction about the characteristics of the four glaciers and its environment. Afterward the utilized data collection protocol and the analysis technique are shortly represented. The main part of the manuscripts are the descriptions of the abundances of the numerous analyzed major, trace, and rare earth elements in the ice and snow probes and the debris samples. Some of the measured concentrations are related to signatures of the surrounding environmental conditions, such as the aerosol contributions from the neighboring ocean, trace abundances of the upper continental crust, or anthropogenic pollutants transported by atmospheric circulations to the glaciers. The discussion and conclusions close the manuscript. The manuscript's structure needs to be improved. In addition it would immensely benefit from some professional language editing.

The selected journal "Earth System Science Data" aims to foster the publication of reference data of benefit to the earths system science community. Since no data set of such quality is to my knowledge freely available, I recommend the publications of the manuscript after minor revisions.

A more detailed review is attached as portable data format (pdf) file.

Please also note the supplement to this comment:
http://www.earth-syst-sci-data-discuss.net/5/C37/2012/essdd-5-C37-2012-supplement.pdf

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5, C37–C39, 2012