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Interactive comment on "OCTOPUS: An Open Cosmogenic Isotope and Luminescence Database" *by* Alexandru T. Codilean et al.

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Dear Zsófia

Thank you for taking the time to carefully read the manuscript and provide comments.

(1) As far as your **first comment** goes, you are right that the name of the database (and hence the title of this paper) is quite broad. However, we do not deem it misleading.

We have spent a long time thinking of a suitable name. Given that we hope OCTOPUS to be a long-term venture, we did not want to pick a name that is too restrictive. We hope that for future releases of the database we will be able to include OSL data from other parts of the world and from other landforms (such as dunes, for example) in addition to expanding and refining the current collections. Further, we are also contemplat-

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ing including CRN data from bedrock outcrops. The volume of globally available fluvial OSL data is substantially larger than the global fluvial CRN data and this has meant that to start we had to prioritise our data compilation efforts and so decided to limit the OSL data to the Australian continent only.

Indeed, if read in isolation, the first sentence of the abstract can be misleading since it says “open and global” and does not clarify that the CRN data is only from modern fluvial sediment. This is also a point picked up by Ingrid Ward in her comment. However, the abstract provides ample detail on what the CRN and OSL collections consist of.

To make things clearer we will change the text throughout to point out that the CRN collection is focusing on modern fluvial sediment only. We will also modify the first sentence of the abstract to make it clearer that the OSL data is limited to the Australian continent.

(2) As far as your **second comment** goes, you note that in our recalculation of the CRN data using CAIRN, we are not accounting for the lithological control on quartz abundance, and that using the 90m resolution SRTM data might compromise detail when it comes to smaller catchments. Although this comment has merit, **we wonder whether it misses the point of what OCTOPUS is trying to achieve**?

As we point out in the introduction, calculation procedures, constants, and AMS measurement standards have changed with time as we have refined (and continue to refine) our understanding of the technique, and so it is imperative that CRN-based denudation rates and exposure ages published in different studies are recalculated prior to comparing them to each other. Yet, as we also point out in the introduction, this recalculation is not always possible with ease given that comprehensive metadata is not always provided. As we mention in section 4.1 of our manuscript, about 5% of all the CRN data that we have compiled had to be excluded from OCTOPUS due to lack of appropriate metadata in the original publications. These data are essentially lost and have no value beyond the scope of the original studies in which they appeared in.

A more important issue, however, and one that we do not emphasise in the manuscript (but should), is that in the past, every CRN study looking at denudation rates used some slightly different combination of shielding and production schemes and parameters, and the actual code used for doing the calculations was not open source so not only were other people's denudation rates not reproducible but they also were not consistent so one couldn't seriously do intercomparison. Some examples of how different calculation procedures have been, are provided by Mudd et al. in the manuscript describing CAIRN (https://www.earth-surf-dynam.net/4/655/2016/); see their Table 3 that we also attach below.

Given the above, the ****WHOLE POINT** of OCTOPUS** was to produce a database of CRN-based denudation rates that are (1) **globally consistent** – via recalculation of all denudation rates using one consistent approach, and (2) **reproducible and reusable** – via providing all input geospatial data and comprehensive metadata, and using an open source code, such as CAIRN.

When adopting such a global approach, certain compromises need to be made. For example, one needs to choose a DEM that is global (or near global) in extent and at a resolution that can cater for the range of basin areas present. Further, certain corrections that individual studies have made – such as correcting for quartz abundance differences or shielding due to snow cover – might not be feasible for a global database given the lack of globally consistent data on the parameters that are to be corrected for.

OCTOPUS compensates for these compromised by:

(a) Providing the user with everything necessary to recalculate denudation rates. CAIRN being open source (and available online here: https://github.com/LSDtopotools/) users may also modify the code to suit their needs; and

(b) Providing originally published denudation rates along with the recalculated ones so

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that detailed comparisons can be made by those that desire.

Considering the second comment, we will modify the text of the introduction to emphasis the importance of having a transparent, consistent, and reproducible way of calculating CRN-based denudation rates.

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Table 3. Data sets used for method comparisons. ^{10}Be production rate (Prod rate) is given for sea level, high latitude and in units of atoms g^{-1} yr^{-1}. "CR" or "CR muons" refers to the spallation or muon calculation methods and production rates used in CRONUS-2.2 (Balco et al., 2008). The scaling values, production rates, topographic shielding and notes reported in this table are for the original studies: CAIRN uses the same settings (see Table 2) for its calculations regardless of site location.

Study	Location	Scaling	Prod. rate	Topo. shielding	Other notes
Bierman et al. (2005)	New Mexico, USA	Lal/Stone	5.2	None	$\rho = 2.7\,g\,cm^{-3}$, no muons.
Dethier et al. (2014)	Colorado, USA	Lal/Stone	4.49 (CR)	None	$\rho = 2.7\,g\,cm^{-3}$, fast muons only.
Kirchner et al. (2001)	Idaho, USA	Lal/Stone	4.72	Dunne et al. (1999), details not given.	Corrections for chemical weathering.
Munack et al. (2014)	Ladakh, India	Lal magnetic	4.49 (CR)	Pixel-by-pixel, but details not given.	CR muons. Snow and ice shielding considered.
Palumbo et al. (2010) and Palumbo et al. (2011)	Tibet	Dunai (2000)	5.12	Codilean (2006), $\Delta\phi$, $\Delta\theta$ not reported.	Muons using Granger and Smith (2000) scheme. $\rho = 2.65\,g\,cm^{-3}$.
Safran et al. (2006)	Bolivia	Dunai (2000)	None	No muons. ρ not reported. Corrections for quartz fraction.	
Scherler et al. (2014)	Garwahl Himalaya	Lal magnetic	4.49 (CR)	Pixel-by-pixel, but details not given.	CR muons. Snow and ice shielding considered.

Fig. 1. Table 3 from Mudd et al. 2016 (https://www.earth-surf-dynam.net/4/655/2016/).