

## ***Interactive comment on “CLARA-SAL: a global 28-yr timeseries of Earth’s black-sky surface albedo” by A. Riihelä et al.***

**Anonymous Referee #1**

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This paper is introducing a newly developed novel dataset of 28-year long black-sky surface albedo. As authors mentioned in the introduction of the paper, there are some satellite-derived datasets that include surface albedo product, this one is especially dealing with black-sky surface albedo. Taking into account the topography correction of geolocation is a primary credit for this paper, but surely not enough to make a long-term dataset suitable for climate study, in particular, data from space-borne different satellites. I think the paper needs some revision to be accepted by this journal.

1. Sections 3.1: Please clarify how you reprojected 4.4 km GAC data to 25 km EASE-grid in detail, along with the treatment of underlying surface type. Did you resample (pick third pixel from every 5 pixels in a line or a 5x5 box) or average original GAC data? 2. Section 3.2: Keeping AOD and Ozone constant over time and space can

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be very problematic for the albedo retrieval. If it is hard to get real-time data, at least some climatological data for AOD and ozone should be considered in terms of season and different latitude bands. And I don't also understand why the water surface albedo is a constant value of 0.0676 since AVHRR visible channels provide some information about the water surface and quality. And authors didn't mention how to retrieve ice surface albedo, please add it in, since it seems to be a global dataset including polar regions. 3. Section 4: In any long-term dataset generation from space-borne different satellites, the inter-calibration between different satellites are important to guarantee the dataset consistent without systematic biases due the switch of the satellites over time, because the sensors onboard satellites degrade over time after launch, and different satellites may experience different after-launch calibrations, though in general it is small for AVHRR visible channels. I suggest authors discuss this issue in the paper, at least summarize other researchers' results. 4. Section 4: The validation results with in-situ observations are hard to say good, for monthly average, the relative errors are way too large over 10%, this might attribute to the retrieval considerations.

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