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# An assessment of SEVIRI imagery at different temporal resolutions and the effect on accurate dust emission mapping

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This paper compares Dust RGB products derived from the Spinning Enhanced Visible and Infrared Imager (SEVIRI) data at 15 minute, 30 minute and hourly temporal resolutions. From January 2006 to December 2006, observations of dust emission point sources were observed at each temporal resolution across the entire Middle East region (38.50N; 30.00E – 10.00N; 65.50E). Previous work has demonstrated that 15-minute resolution SEVIRI data can be used to map dust sources across the Sahara by observing dust storms back through sequential images to the point of first emission (Schepanski et al., 2007; 2009; 2012). These observations have improved upon lower resolution maps, based on daily retrievals of aerosol optical depth (AOD), whose maxima can be biased by prevalent transport routes, not necessarily coinciding with sources of emissions. Based on the thermal contrast of atmospheric dust to the surface, brightness temperature differences (BTD's) in the thermal infrared (TIR) wavelengths (8.7, 10.8 and 12.0 $\mu$m) highlight dust in the scene irrespective of solar illumination, giving both increased accuracy of dust source areas and a greater understanding of diurnal emission behaviour. However, the highest temporal resolution available (15-minute repeat capture) produces 96 images per day, resulting in significantly higher data storage demands than 30 minute or hourly data. To aid future research planning, this paper investigates what effect lowering the temporal resolution has on the number and spatial distribution of the observed dust sources.

The results show a reduction in number of dust emission events observed with each step decrease in temporal resolution, reducing by 17% for 30-minute resolution and 50% for hourly. These differences change seasonally, with the highest reduction observed in summer (34% and 64% reduction respectively). Each resolution shows a similar spatial distribution, with the biggest difference seen near the coastlines, where near-shore convective cloud patterns obscure atmospheric dust soon after emission, restricting the opportunity to be observed at hourly resolution.