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Atmospheric Measurement Techniques Discussions

Interactive comment on "Dissecting effects of orbital drift of polar-orbiting satellites onaccuracy and trends of cloud fractional cover climate data records" *by* Jędrzej S. Bojanowski and Jan P. Musiał

Anonymous Referee #2

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In this paper, the authors quantified the uncertainty and magnitude of spurious trends induced by satellite orbit drift in the AVHRR-based cloudness records. The authors estimated that the mean monthly cloud fractional cover of individual NOAA/MetOp satellites reach +/-10%, and the spurious trends reaches +/-7% per decade. For the combined data record, biases of mean and trends is 3% and 1% per decade, respectively. The authors suggest that the AVHRR-derived cloud fraction cover do not comply with the GCOS temporal stability requirement of 1% CFC per decades just due to the orbital drift effect before 2002, while this requirement is fulfilled after 2003. In general,

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Discussion paper

the paper is well written, and the results are useful for climate studies. The paper might be accepted after addressing the following comments:

(1) In this paper, effect of orbital drift on diurnal cycle has been fully considered. However, the orbital drift could affect cloud cover through other ways, such as changes in solar zenith angle, satellite viewing angle, and orbit altitude. If a same cloud retrieval algorithm is used during the entire satellite operation period, changes in these geometric parameters would result in artificial cloud cover trends. The title of the paper is “Dissecting effects of orbital drift of polar-orbiting satellites”, so effect of orbital drift on geometric parameters should also be discussed. (2) The authors might compare the new algorithm in this paper with methods in previous papers, and discuss the advantages and disadvantages of this approach. (3) Line 15: “the time series starting in 2003 is shorter than 30 years that voids climatological analyses.” Climatological analyses involve studies of various timescales, so records shorter than 30 years do not void climatological analyses.

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