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# *Interactive comment on* "A global long-term (1981–2000) land surface temperature product for NOAA AVHRR" *by* Jin Ma et al.

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Dear Dr. Andreas Baumann,

Thank you very much for your comments and questions.

Sorry for the missing explanation of $\epsilon_{11}$, $\epsilon_{12}$, and CWVC. In our context, they are the Land Surface Emissivitys (LSE) of NOAA AVHRR band centered at 11$\mu$m and 12$\mu$m, and column water vapour content, respectively. The study is a continuation of Zhou et al. (2019b) and, in order to be consistent with our previous study, the uncertainty thresholds were chosen to be similar to Zhou et al. (2019b).

LSEs and CWVC are the main input parameters of the Split-window Algorithm. Therefore, we analyzed the sensitivity of the candidate SWAs to these input parameters. We



used the NDVI-threshold method to determine the LSEs of a given pixel. A method comparison performed by Sobrino et al. (2001) yielded root-mean-square errors of 0.020 between the NDVI-threshold method and the Temperature-Independent Spectral Indices method and of 0.025 between the NDVI-threshold method the Thermal Infrared Radiance Ratio Model. Therefore, we increased the uncertainty of the NDVI-threshold method and the maximum uncertainty of LSE to 0.020 for level 1 (L1) and 0.040 for level 2 (L2). CWVC was derived from the Modern-Era Retrospective Analysis for Research and Applications (MERRA) dataset. Validation indicates that CWVC is biased by 0.24 g/cm$^2$ in the tropical zone (Rienecker et al., 2011). Considering the typical inhomogeneity within a MERRA grid, we increased the maximum CWVC uncertainty to 1.0 g/cm$^2$. This results in two combinations of maximum LSE uncertainty and CWVC uncertainty, which we grouped into two levels: (i) L1: $|\delta\epsilon_{11}|_{max}\leq$ 0.02, $|\delta\epsilon_{12}|_{max}\leq$ 0.02, and $|\delta\text{CWVC}|_{max}\leq$ 1.0 g/cm$^2$; (ii) L2: $|\delta\epsilon 11|_{max}\leq$ 0.04, $|\delta\epsilon 12|_{max}\leq$ 0.04, and $|\delta\text{CWVC }|_{max}\leq$ 1.0 g/cm$^2$.

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Thank you again and Best Regards,

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