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How does clear-sky terrestrial irradiance vary with solar activity?

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I investigate recent claims for a strong variation of clear-sky terrestrial solar irradiance with solar activity (on the level of $\mathcal{O}(1\%)$ over the 11-year cycle) derived from ground-based observations of the Sun. As it turns out, these erroneous results arise because important effects like the dimming by volcanic aerosols and long-term changes in atmospheric transmission independent of solar activity have to be corrected for. After taking these into account, clear-sky terrestrial solar irradiance can be shown to vary by $\mathcal{O}(0.1\%)$ as expected from satellite-based measurements of the changes in Total Solar Irradiance over the solar cycle. On the one hand this example illustrates the usefulness of ground-based monitoring of solar irradiance data, but on the other hand it highlights the difficulties which can hamper an unbiased analysis of such datasets.

References

Feulner, G., 2011: *The Smithsonian solar constant data revisited: no evidence for a strong effect of solar activity in ground-based insolation data*, Atmos. Chem. Phys., **11**, 3291–3301, doi:10.5194/acp-11-3291-2011

Feulner, G., 2013: *On the relation between solar activity and clear-sky terrestrial irradiance*, Solar Phys., **282**, 615–627, doi:10.1007/s11207-012-0129-z