

# Atmospheric temperature measurements biases on the Antarctic plateau

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Observations of atmospheric temperature made on the Antarctic plateau with thermistors housed in naturally (wind) ventilated radiation shields are shown to be significantly warm biased by solar radiation. High incoming solar flux and high surface albedo result in radiation biases in Gill (multiplate) styled shields that can occasionally exceed 10°C in summer in case of low wind speed. Although stronger and more frequent when incoming solar radiation is high, biases exceeding 8°C are found even when solar is less 200 Wm<sup>-2</sup>. Comparing with sonic thermometers, which are not affected by radiation but which are too complex to be routinely used for mean temperature monitoring, commercially available aspirated shields are shown to efficiently prevent thermistor measurements from solar radiation biases. Most of the available in situ reports of atmospheric temperature on the Antarctic plateau are from automatic weather stations that use passive shields and are thus likely warm biased at least in the summer. In spite of low consumption, deploying aspirated shields at remote locations in such a difficult environment may be a challenge. Bias correction formulae are not easily derived and are obviously shield dependent. On the other hand, because of a strong dependence of bias to wind speed, filtering out temperature reports for wind speed less than a given threshold (about 5-6 ms<sup>-1</sup> for the shields tested here) may be an efficient way to quality control the data, albeit at the cost of significant data loss and records biased towards high wind speed cases.