## Measurement of decadal-scale climate change from space

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A critical test of climate model performance is the ability to predict decadal scale changes. Fundamental to the assessment of climate models is a dataset of measurements against which their predictions can be evaluated. In this paper we discuss an approach to achieve a series of highly accurate measurements from space for the purpose of observing decadal scale changes in the climate and for assessing climate model physics. Accurate measurement of reflected solar radiation and emitted infrared radiation from the Earth and its atmosphere, traceable on-orbit to international (Systeme Internationale or SI) standards, are now possible. These measurements, complemented by radio occultation measurements from the global navigation satellite systems, comprise a series of "SI-traceable" measurements of high accuracy capable of detecting decadal climate change trends and enabling rigorous testing of climate model physics and predictions. The instruments for making these measurements are of moderate size (~ 75 kg) and power (< 100 W). They also provide in-orbit transfer standards for calibrating other operational sensors including high spectral resolution atmospheric sounders and moderate and broad band resolution radiometers.