Title: A Terrestrial Surface Climate Data Record for Global Change Studies

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The overall objective of this proposal is to produce, validate and distribute a global land surface climate data record (CDR) using a combination of mature and tested algorithms and the best available polar-orbiting satellite data from the past to the present (1981-2009) and which can be extended into the NPOESS era. The data record will consist of one fundamental climate data record (FCDR), the surface reflectance product. Two Thematic CDR's (TCDRs) will also be derived from the FCDR, the normalized difference vegetation index (VI) and LAI/fAPAR. These two products are used extensively for climate change research and are listed as Essential Climate Variables (ECVs) by GCOS. In addition these products are used in a number of applications of long-term societal benefit. The two TCDRs will be used to assess the performance of the FCDR through a rigorous validation program and will provide feedback on requirements for the Surface Reflectance FCDR.

The record will use the best available data, addressing the dynamic data continuity of the input observations, which will be primarily from the AVHRR and MODIS with differing spatial resolutions 4km GAC (1981–present), 1km HRPT and LAC (1992–1998), 250m to 1km MODIS (2000-present). A gap in the data record from these two instruments for the 1999-2000 will be filled using a SPOT VEGETATION surface reflectance product (1km) generated by European GEOLAND2 project. The resulting product will be a consistent climate data record of the Land surface from 1981 to present.

The experience of the team in producing high quality coarse resolution land datasets through these of physically based methods for calibration, geolocation and atmospheric correction is unparalleled. The multi-agency composition of the team will help in the process of building a broad community consensus for the FCDR. The availability of the MODIS and AERONET record for intercomparison and the reuse of the MODIS Processing and Quality Assurance approaches are key to producing a long-term data record from AVHRR and MODIS. Special attention will be paid to product validation and developing realistic uncertainties needed for optimal exploitation of TCDRs. The validation will be linked to and benefit from previous and on-going international validation activities of the CEOS Land Product Validation Working Group. The data distribution will be undertaken by the MODAPS group at NASA GSFC utilizing the Land and Atmospheres Archive and Distribution System (LAADS). This proposal will build on the investigators' experience in developing long-term land data records under the NASA REASON LTDR project, which provides the mechanisms for adaptation of peer-reviewed algorithms, the product generation, distribution, validation and quality control of the Climate Data Record.