The Solar Disk Experiment is picked up in the early morning and taken to launch.

Solar Variability and Climate Change

Measuring the Solar Radius

It is widely believed that variations in the sun's radiative output have played an important role in climate change. Although other processes (e.g., greenhouse effect) are now believed to be the principal drivers of climate change, solar variability remains a critical element, at least in assessing how severe the greenhouse warming is likely to be. The sun's variability originates both in changing surface magnetic features, and in changes of the internal output—its luminosity. The latter is potentially the most important to climate change. To understand the physical mechanisms responsible for the variability in solar luminosity, concurrent measurements of all the global properties of the sun are necessary. Variations of the sun's radius, potentially among the most useful, were the least accurately measured. To overcome this shortcoming, scientists developed balloon-borne instrumentation (Solar Disk Sextant) to make high-precision measurements of the size and shape of the sun, and their variations. Moreover, by determining the relationship between the sun's radius and luminosity variations, it becomes possible to invert historical eclipse data (which provide the solar radius) to estimate the solar luminosity over a period of about 250 years. This information will allow climate modelers to establish more reliably the precise role of solar variability in climate change over that period of time, and allow a better calibration of their models, resulting in a more robust prediction of the greenhouse warming expected within the next few decades.

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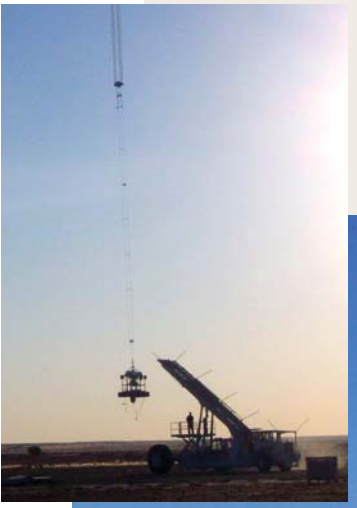

Launching the payload. Below: Inflation of the balloon. Left: Instant of release.