The Millimeter Sky Transparency Imager (MiSTI)

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The Millimeter Sky Transparency Imager (*MiSTI*) [1] is a small millimeter-wave scanning telescope with a 25-cm diameter dish operating at 183 GHz (Figure 1). MiSTI is installed at the ASTE site, Atacama, Chile, and it measures emission from atmospheric water vapor and its fluctuations to estimate atmospheric absorption in the millimeter to submillimeter. MiSTI observes the water vapor distribution at a spatial resolution of 0.5°, and it is sensitive enough to detect an excess path length of ≥ 0.05 mm for an integration time of 1 s. By comparing the MiSTI measurements with those by a 220 GHz tipper, we validate that the 183 GHz measurements of MiSTI are correct, down to the level of any residual systematic errors in the 220 GHz measurements.

Since 2008, MiSTI has provided real-time (every 1 hr) monitoring of the all-sky opacity distribution (Figure 2) and atmospheric transmission curves in the (sub)millimeter through the internet, allowing to know the (sub)millimeter sky conditions in Atacama.

The 183 GHz monitor is available at
http://www2.nao.ac.jp/~misti/opacity.html.

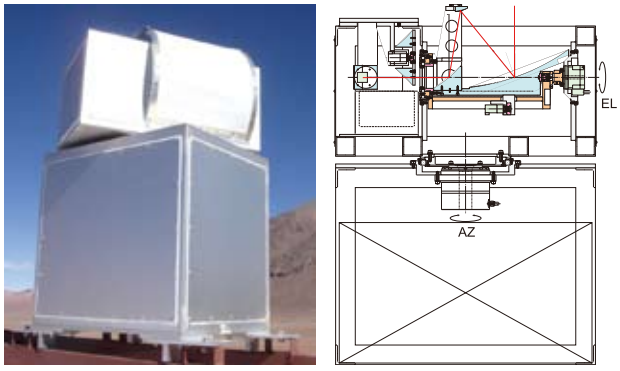

Figure 1: (*left*) A picture of the Millimeter Sky Transparent Imager (MiSTI) installed at the ASTE site. (*right*) Schematic drawing of MiSTI. The membrane and its support structures are not shown. The positions of the azimuth and elevation axes are noted by "AZ" and "EL", respectively.

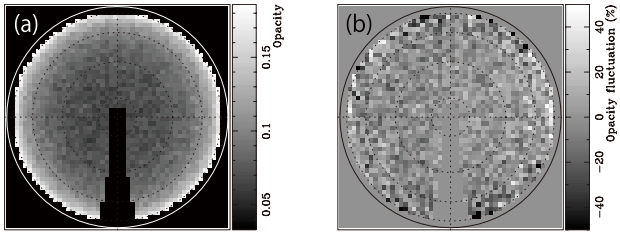

Figure 2: An example of the all-sky opacity image taken with MiSTI on 2010 July 1. (a) All-sky opacity map at 183 GHz in the fish-eye lens view. The sky hemisphere is orthographically projected to the plane of the paper. The north is top and the east is left. The solid and dotted circles indicate the horizon (El = 0°), El = 20, 40, 60, and 80°. (b) The fluctuations of the all-sky opacity map, $\delta\tau$ (Az, El).

Reference

[1] Tamura, Y., Kawabe, R., Kohno, K., et al.: 2011, *PASJ*, **63**, 347.

* The author is at NAOJ when the paper [1] was submitted.