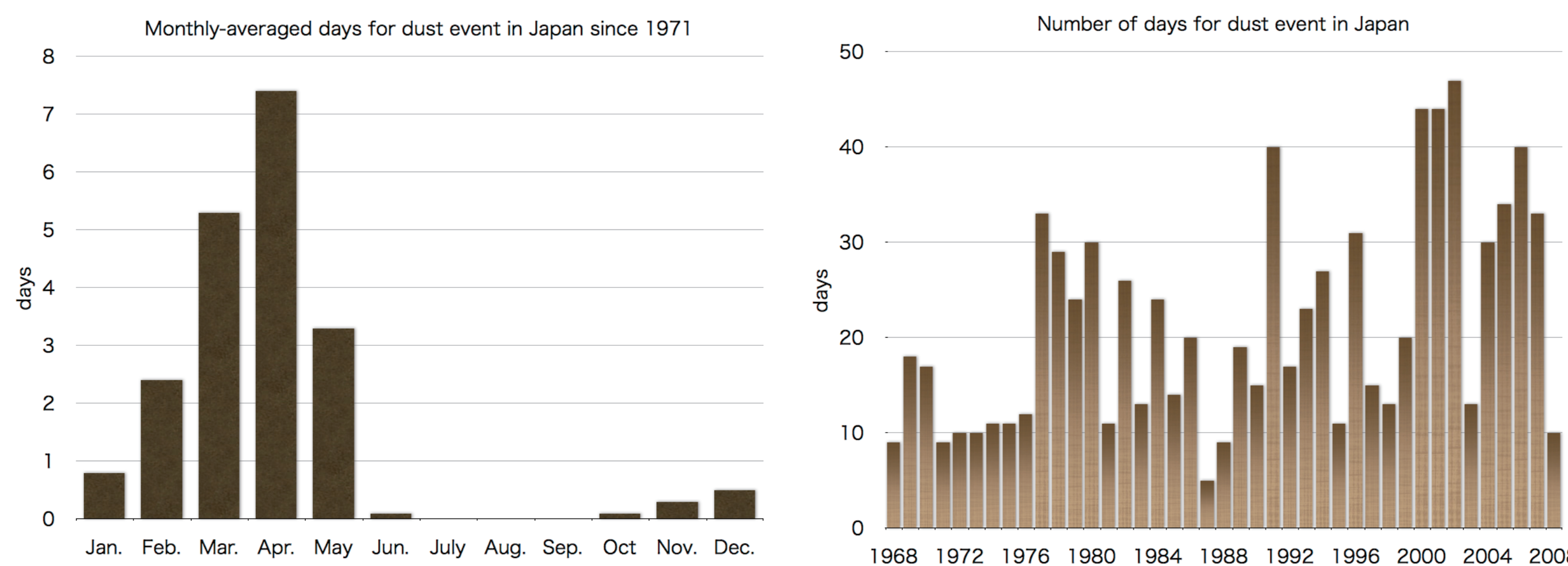


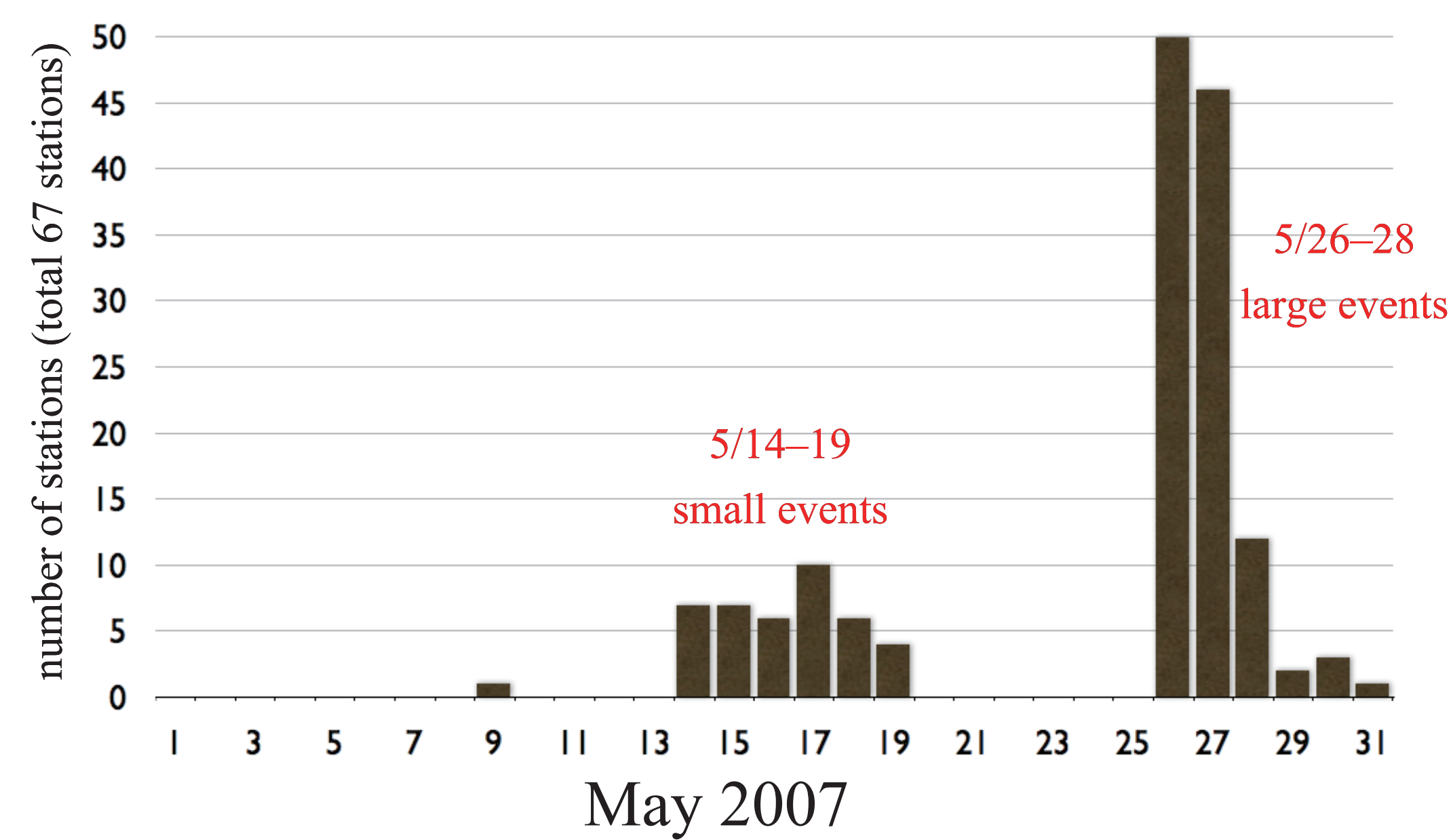
1. Introduction

We have been conducting forecast calculations of chemical species by using WRF/Chem and CHASER since July 2006 (<http://www.jamstec.go.jp/frcgc/gcwm/eng/japan.html>), and we are now trying to include mineral dust aerosols' forecast, because mineral dust has strong impact on the radiation and chemistry in East Asia especially in the spring time.

Strong dust event has been observed in Japan in May 2007, and we compared spacial and temporal distribution of mineral dust aerosols with ground-based and lidar observations.



Number of ground-based stations where dust event was observed in 2007/05



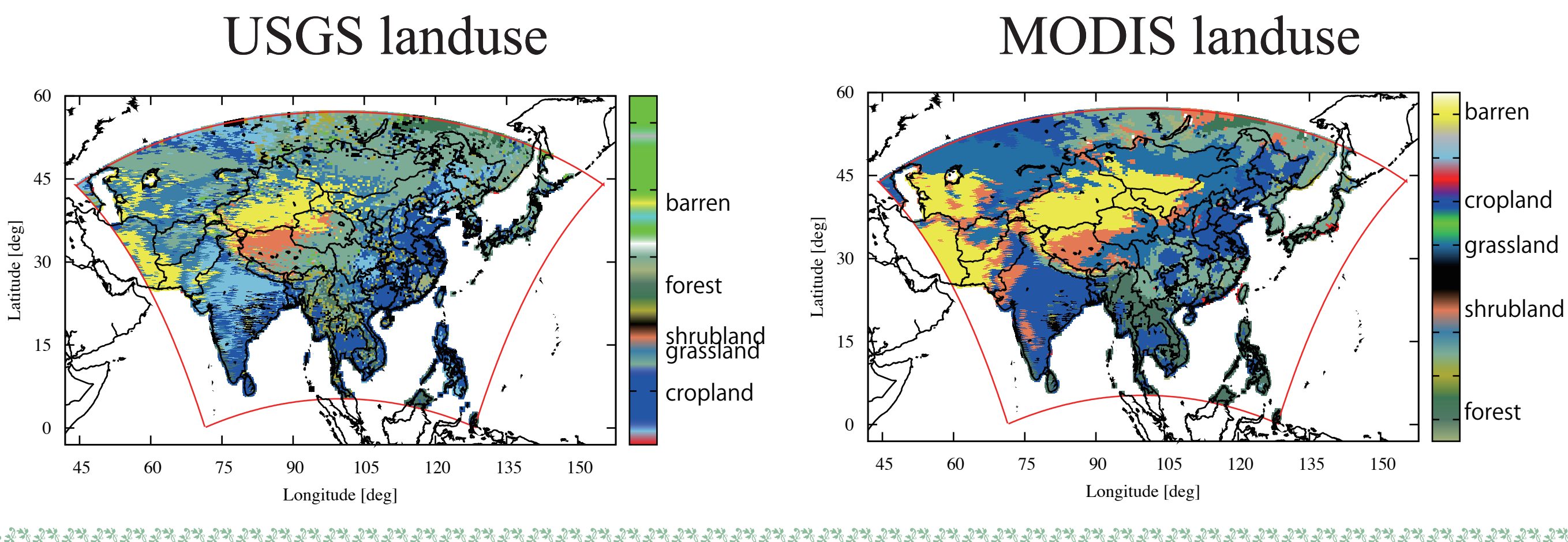
2.2 Dust calculation

Emission : based on Shaw et al. (2008)

Critical friction velocity (u^*) for 12 soil types : Gillete et al. (1982) and Marticorena et al (1997)

Sedimentation : following to GOCART

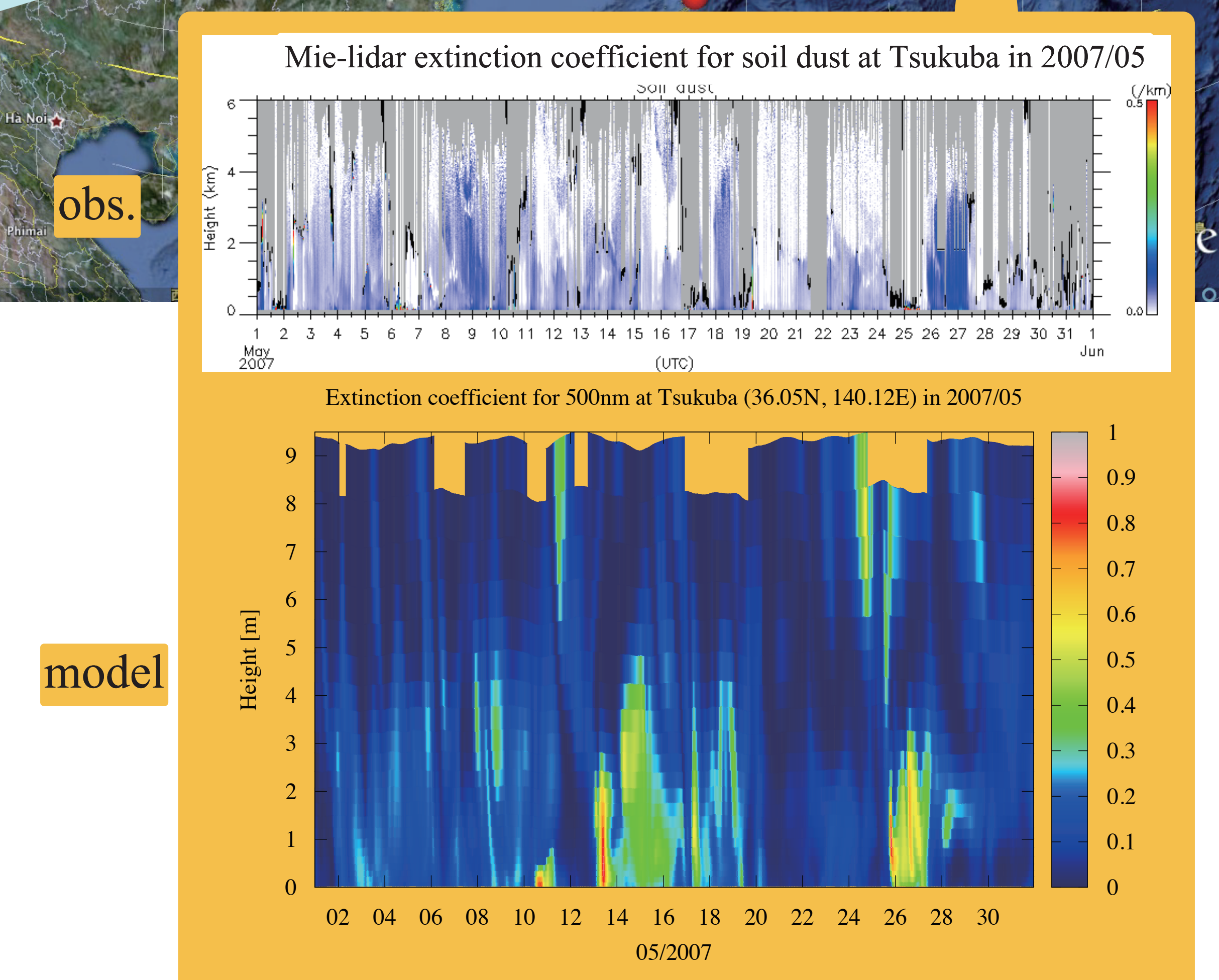
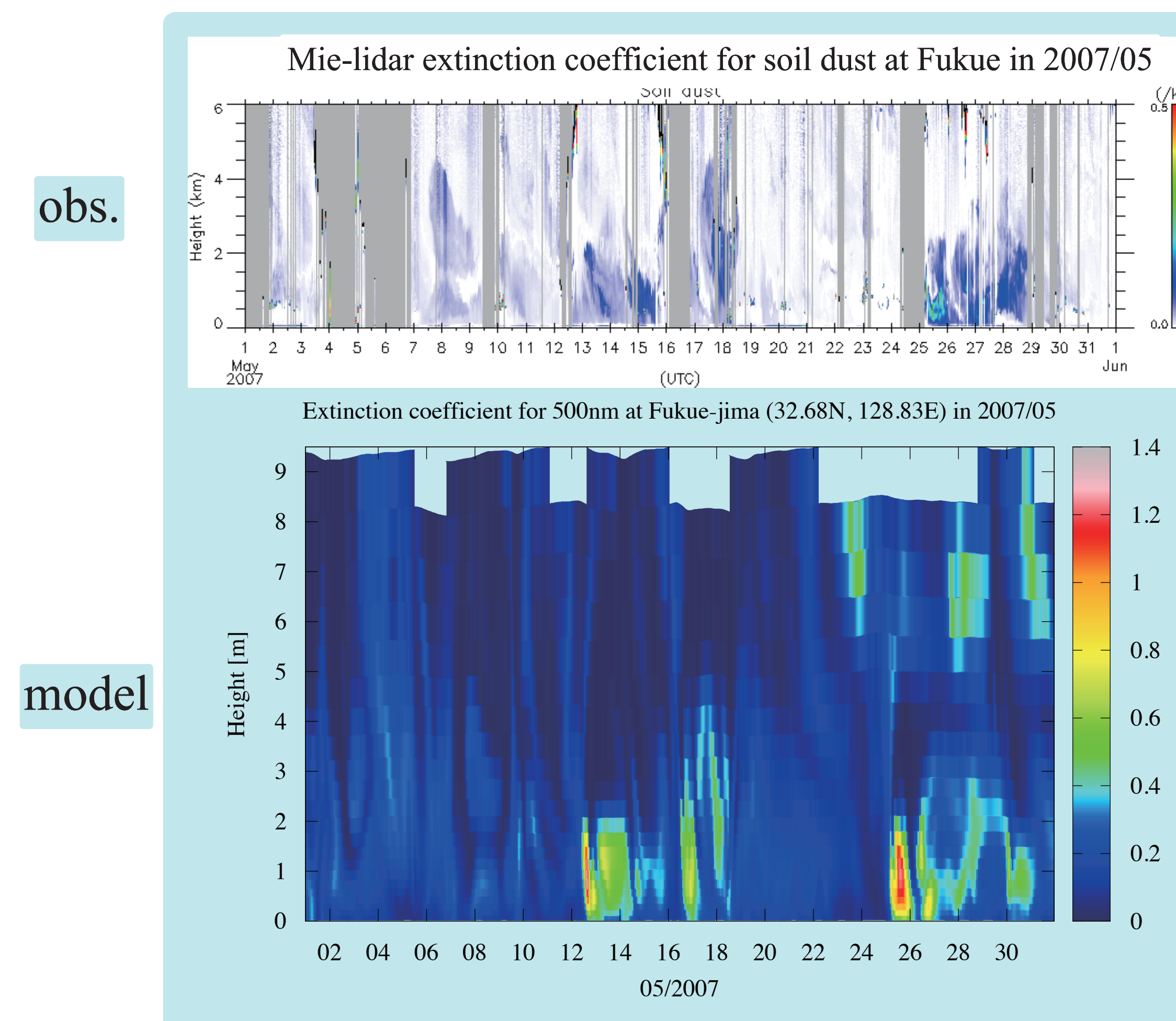
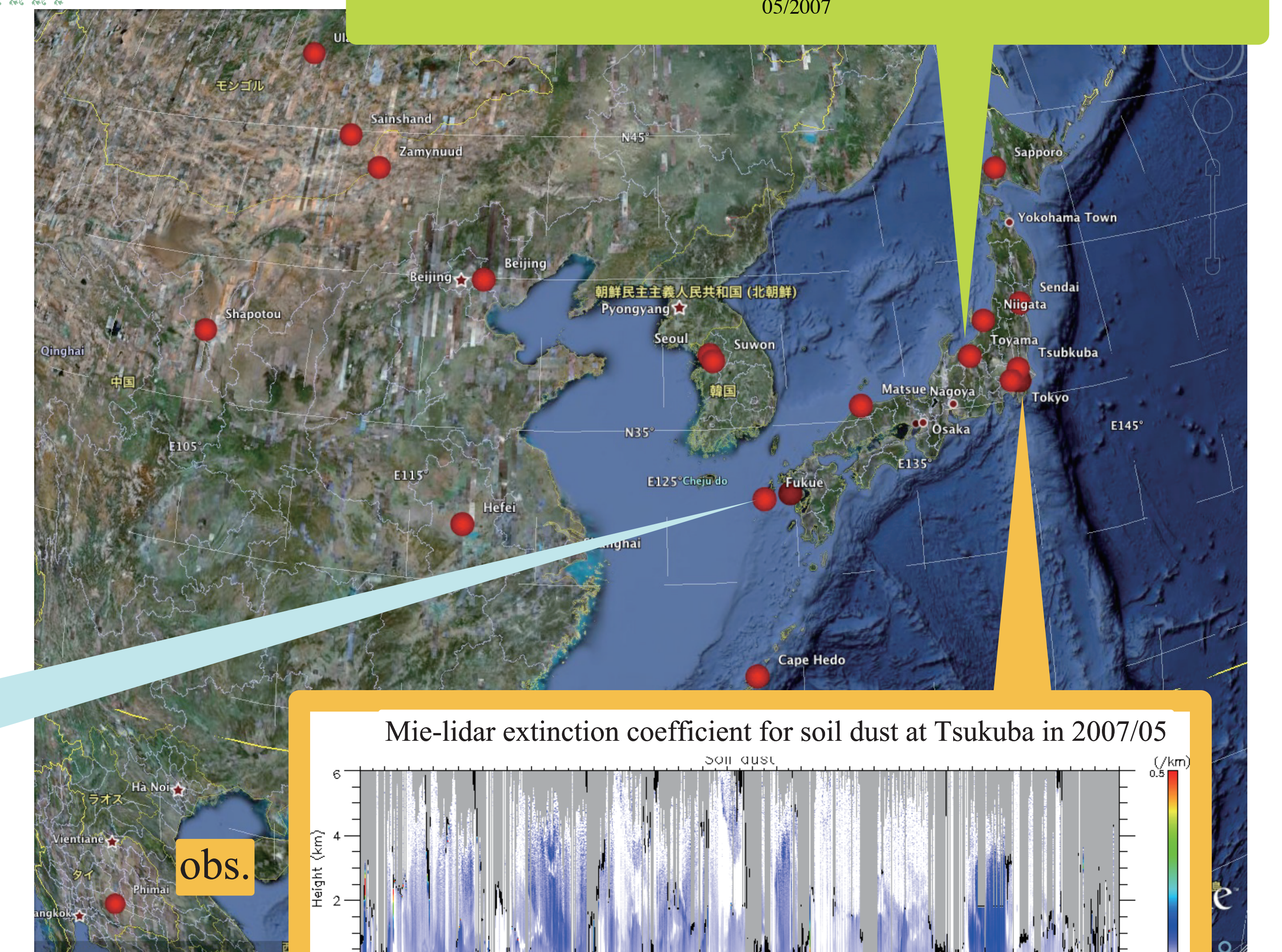
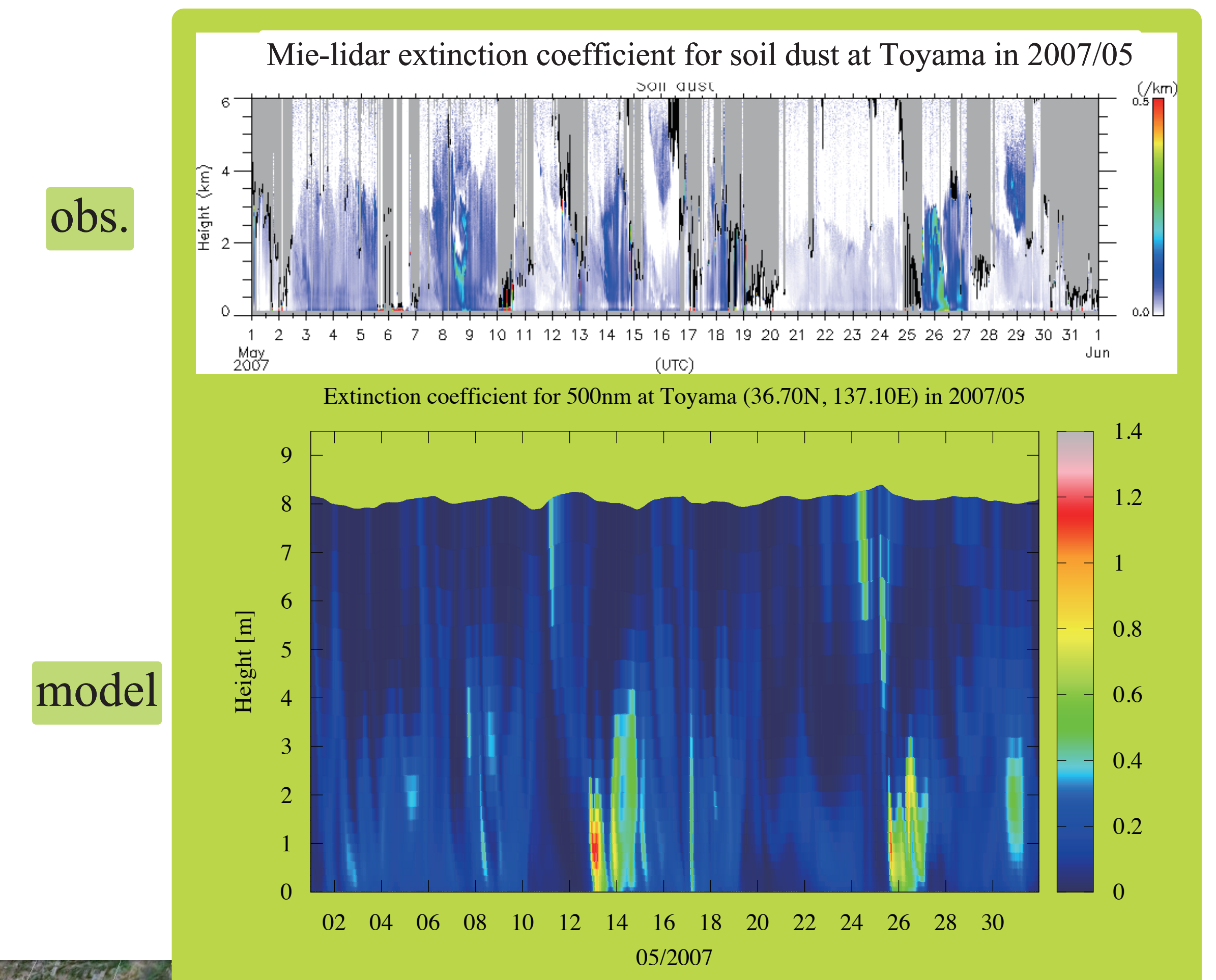
Land-use : As USGS landuse (27 categories) is based on 1993 observation and desert area in China is rapidly increasing in western China and Mongolia in 2000s, MODIS landuse (17 categories) based on 2001 observation is applied in this study.



3. Results

Extinction coefficient for 500nm calculated by the model was compared with the Mie-lidar extinction coefficient for soil dust observed at three lidar stations in Japan (Toyama, Fukue-jima, and Tsukuba). A large dust event was observed from ground-based stations on 26 and 27 May, 2007 (50 of 67 stations observed dust event), and model and lidar-observation also show large extinction coefficient during that period. The maximum height of dust event was about 2km at Fukue-jima, and 3 km at Toyama and Tsukuba. The model generally well produced temporal variation and vertical structure during this dust event.

For the next step, we are planning to compare our model results with other instruments such as CALIOP or mixing ratio at the ground level.



2. Model Description

2.1 General Configuration

Horizontal resolution : 40km

Vertical levels : 30 layers (surface to 100hPa)

Boundary condition for met. field: NCEP FNL

Boundary condition for chemical species : global CTM (CHASER)

Anthropogenic emissions : REAS for 2006 for East Asia, and EDGAR 2000 for other region

Biogenic emission : EDGAR 2000

Biomass burning: GFED v2.1 (horizontal distribution) + ATSR hot spot data (temporal variation) based on Freitas et al. (2005)

Soil NOx emission: Yan (2006) for each month

Chemistry model : RADM2 + MADE/SORGAM, considering aerosol/radiation feedback

Dust : Shaw et al. (2008) + gravitational settlement

Land surface model : 4-layer Unified Noah land-surface model

Vertical mixing : Nakanishi and Niino level 3 (2006)

Calculation period : from March to May, 2007 (3 months)