

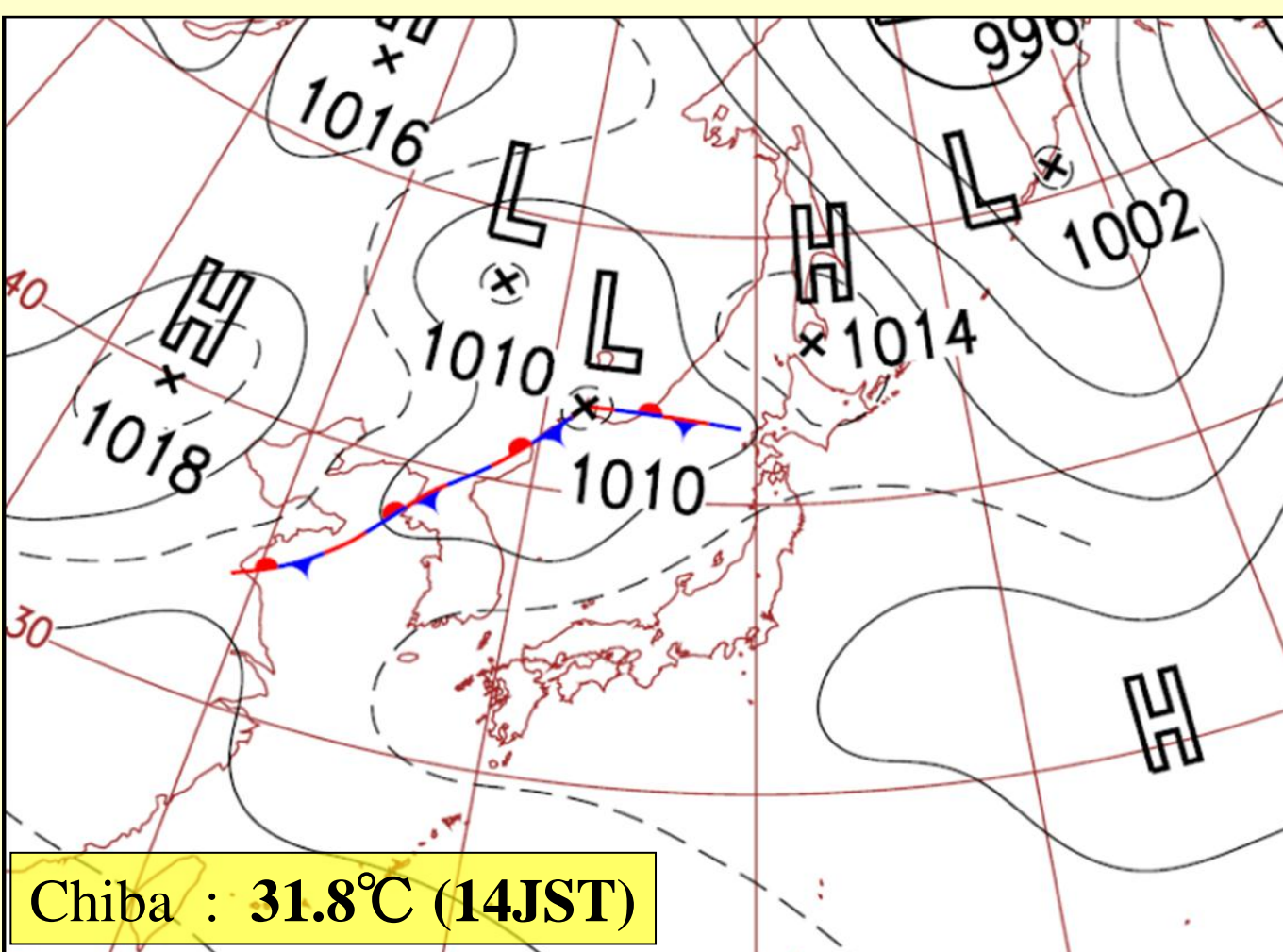
Isolated cumulonimbus initiation observed by MTSAT-1R (rapid scan), 95-GHz FM-CW radar, X-band radar, and photogrammetry in the Kanto region, Japan

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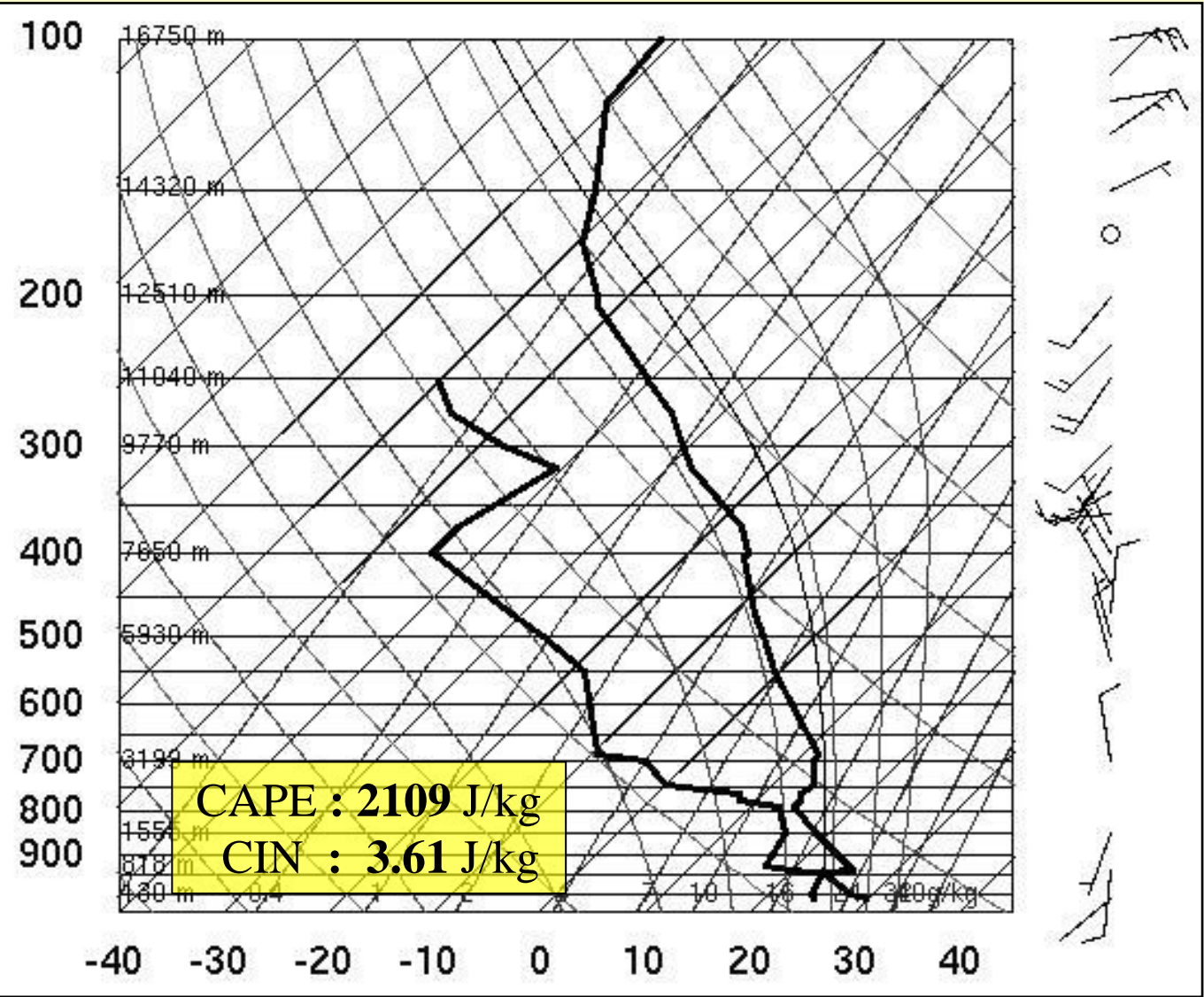
Introduction

Simultaneous observations of cumulonimbi using the MTSAT-1R (rapid scan), the 95-GHz FM-CW cloud radar, the X-band radar, and photogrammetry were carried out during the summer of 2010 in the Kanto region, Japan (Kobayashi et al. 2010) to understand the convection initiation and the structure of heavy rainfall in the Tokyo metropolitan area. The formation process of an isolated cumulonimbus which generated in the afternoon on a fine mid-summer day on 23 August 2010 was presented.

Synoptic situation

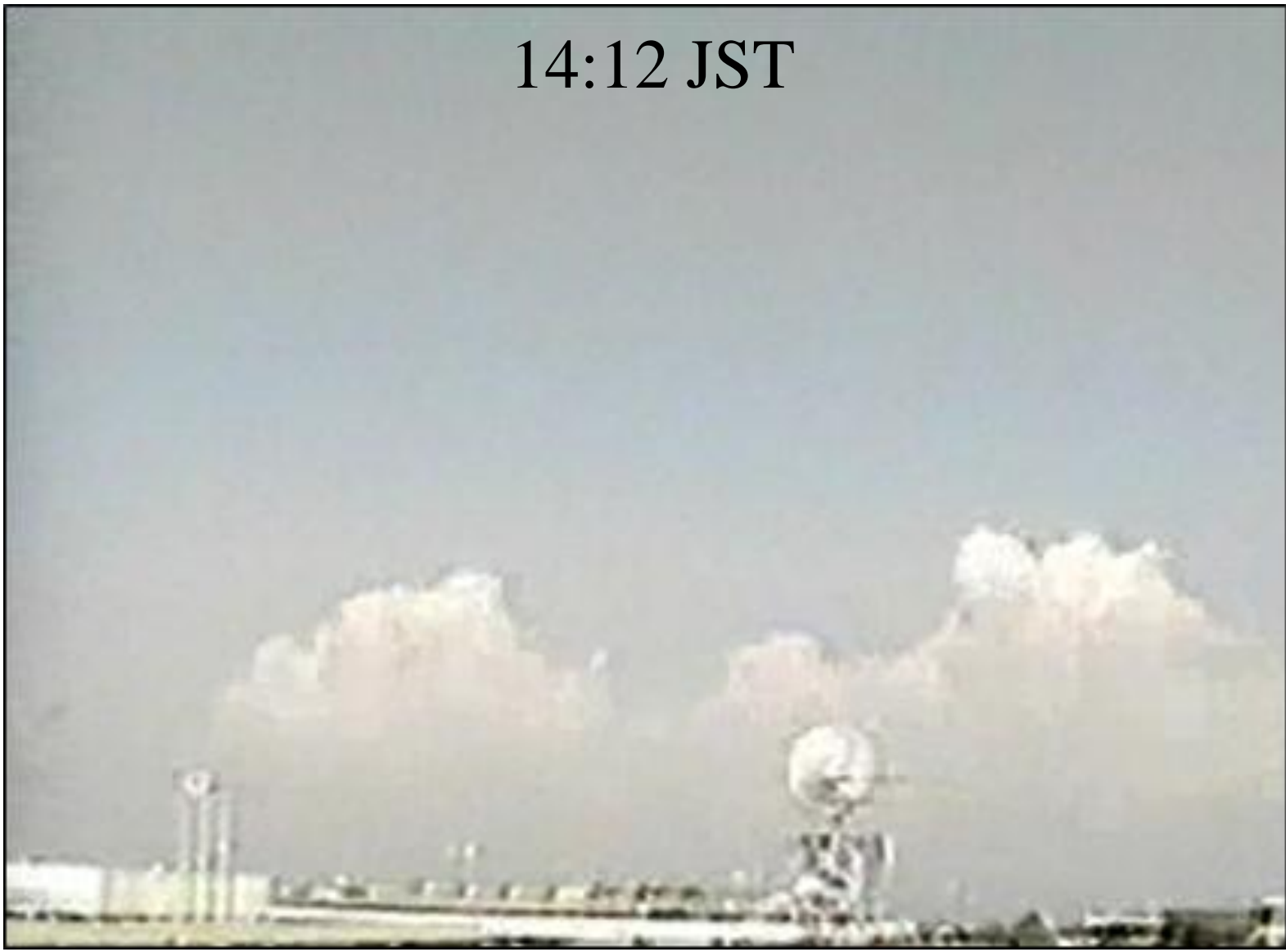


Surface weather chart (09 JST 23 August 2010)

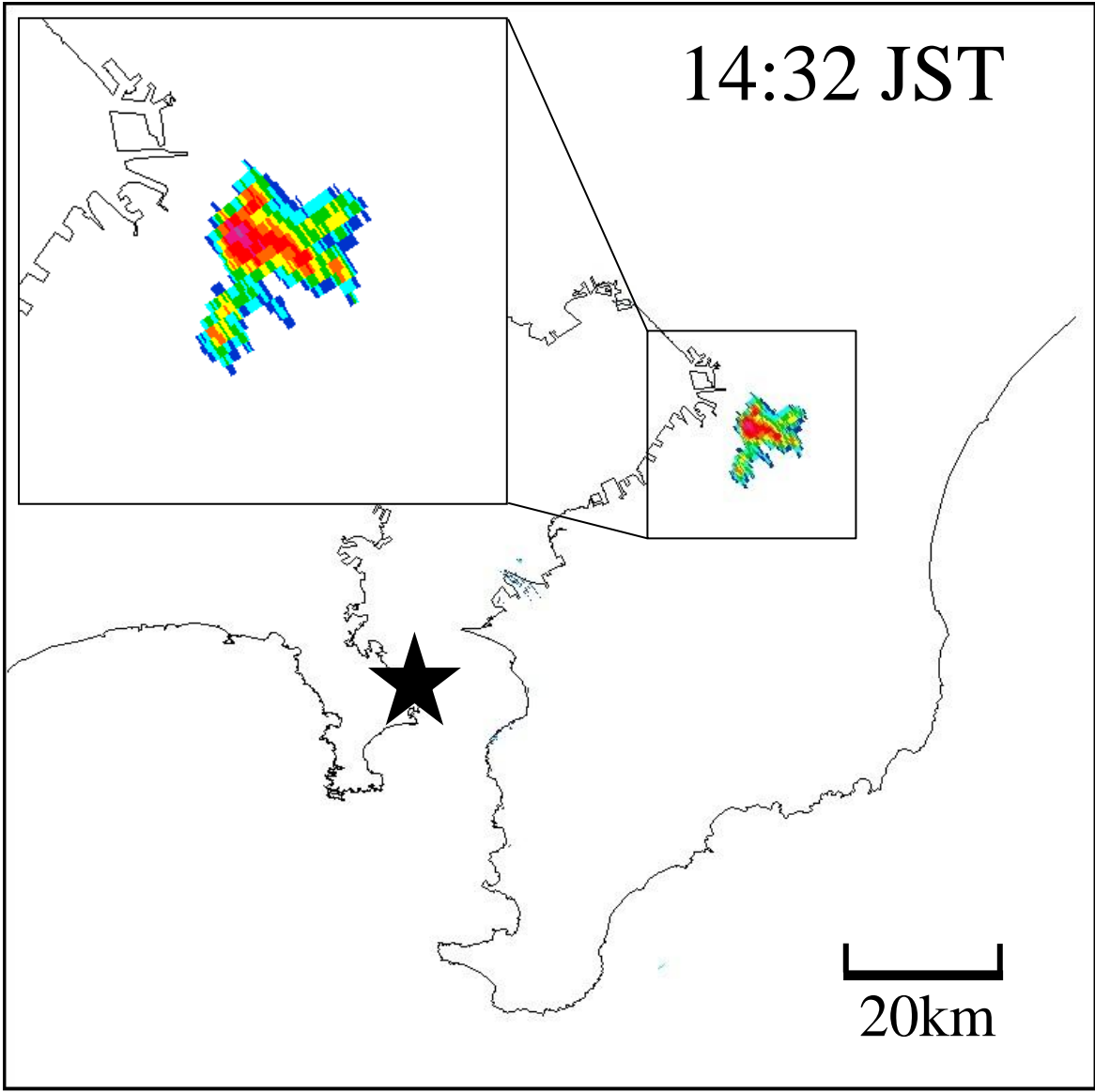
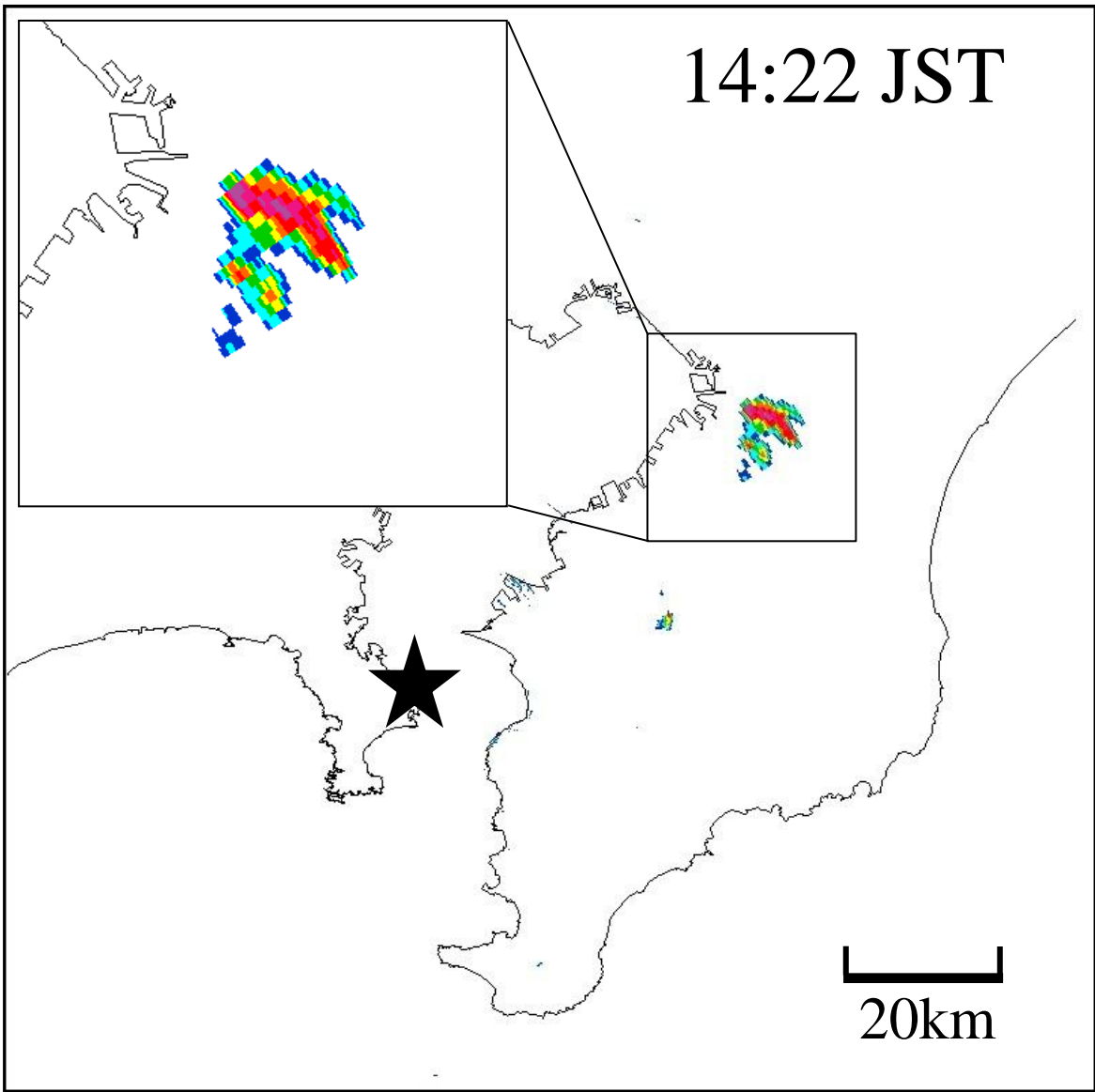
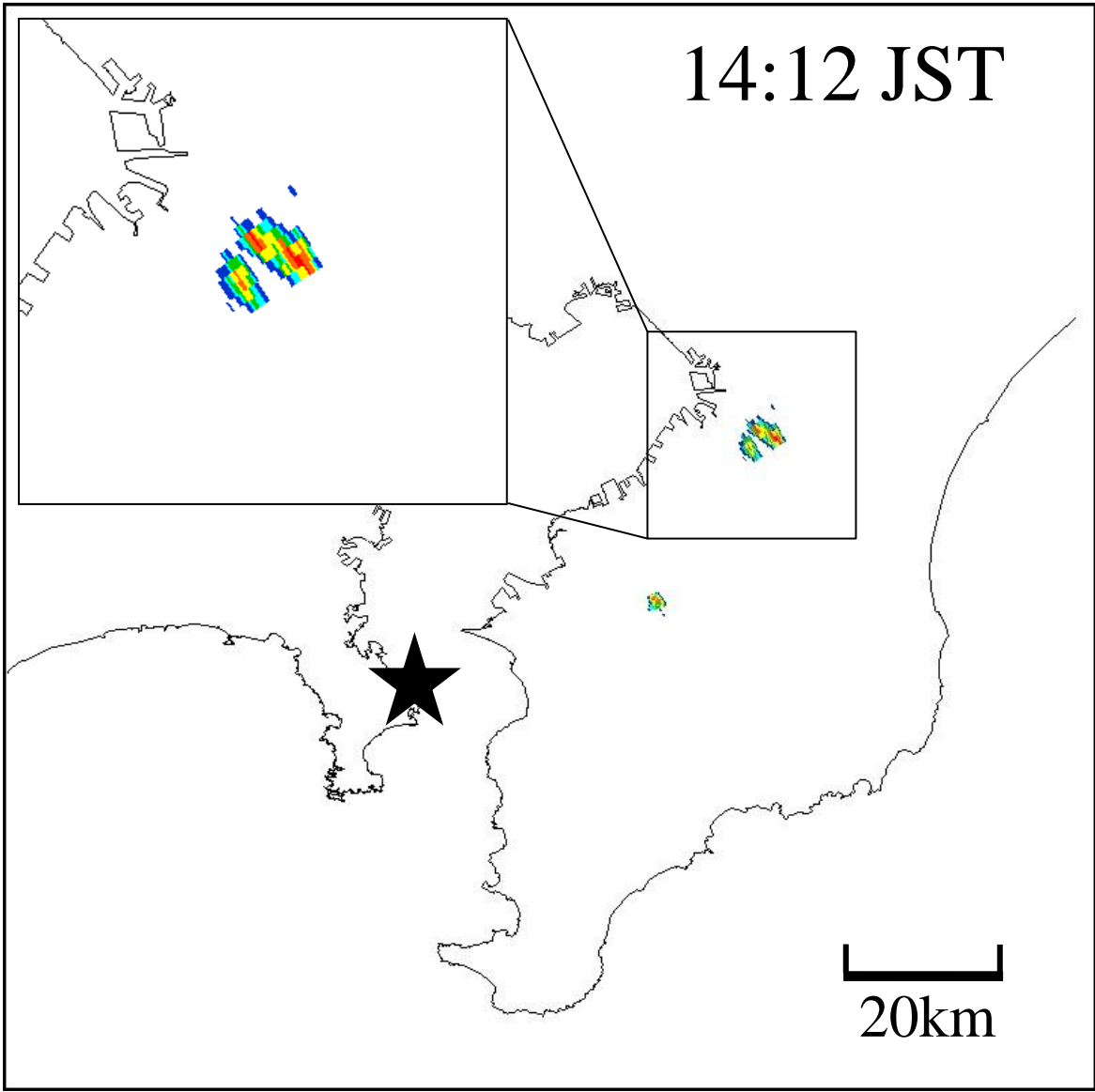
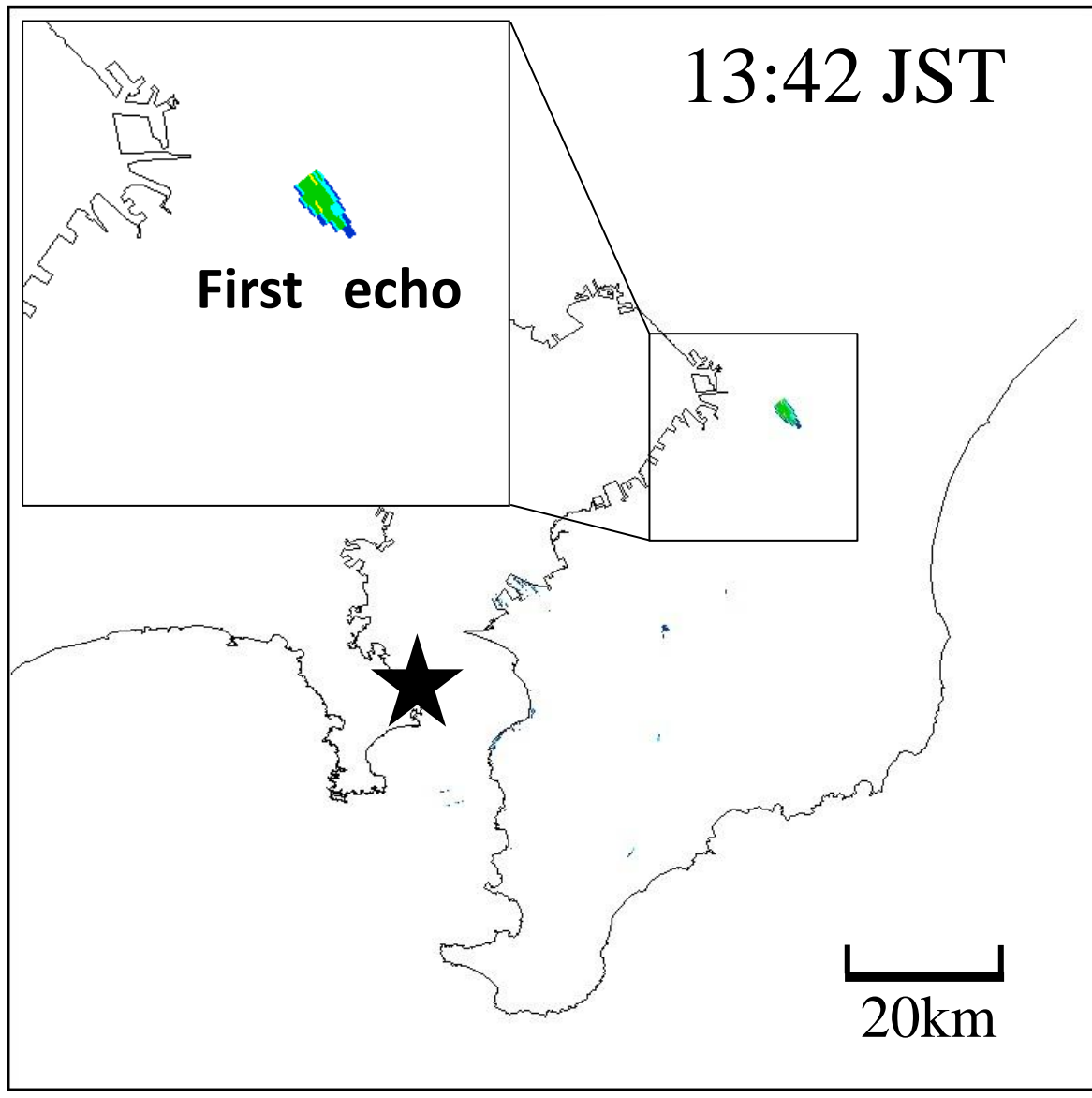
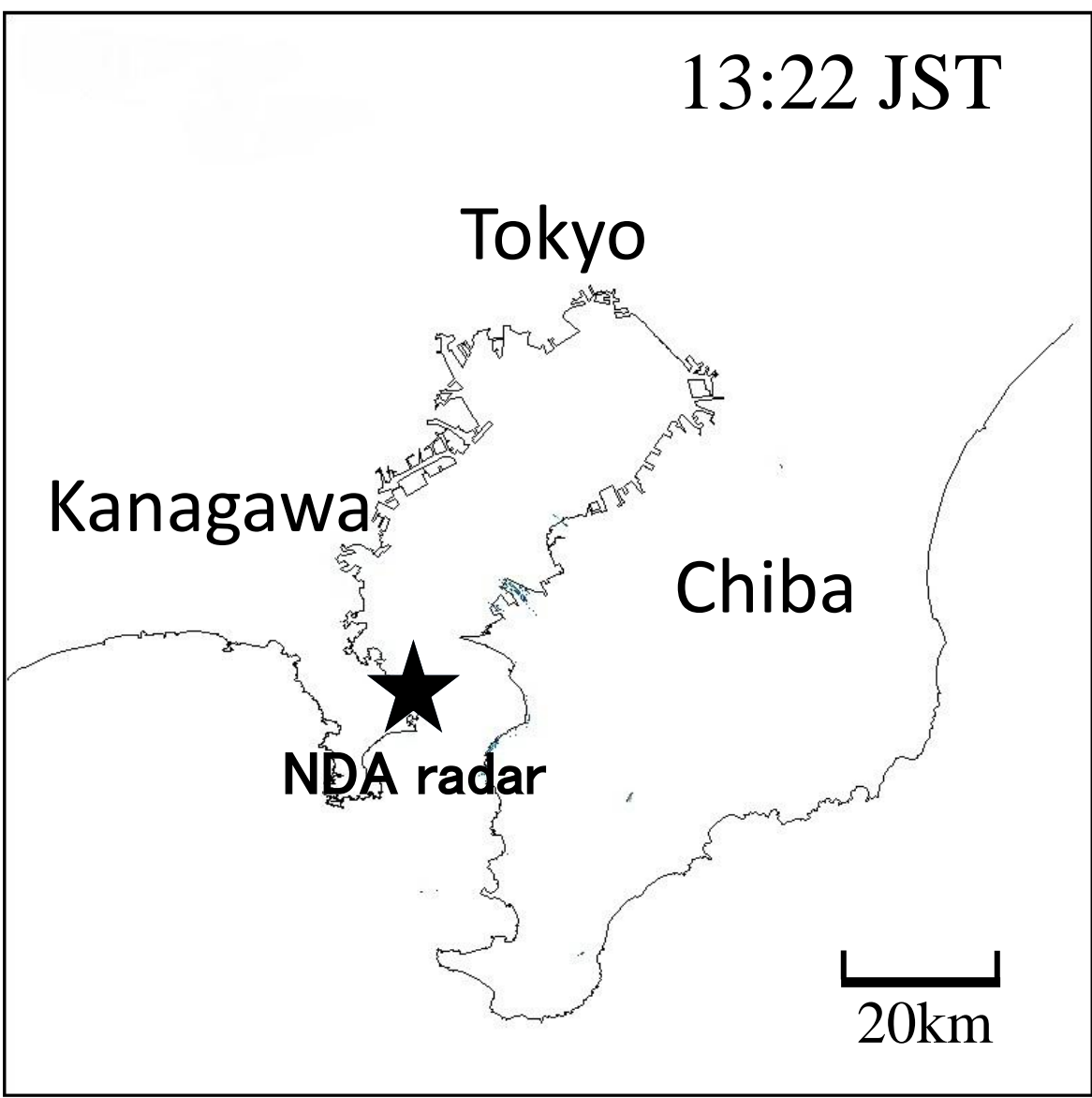


Skew-T (09JST Tateno)

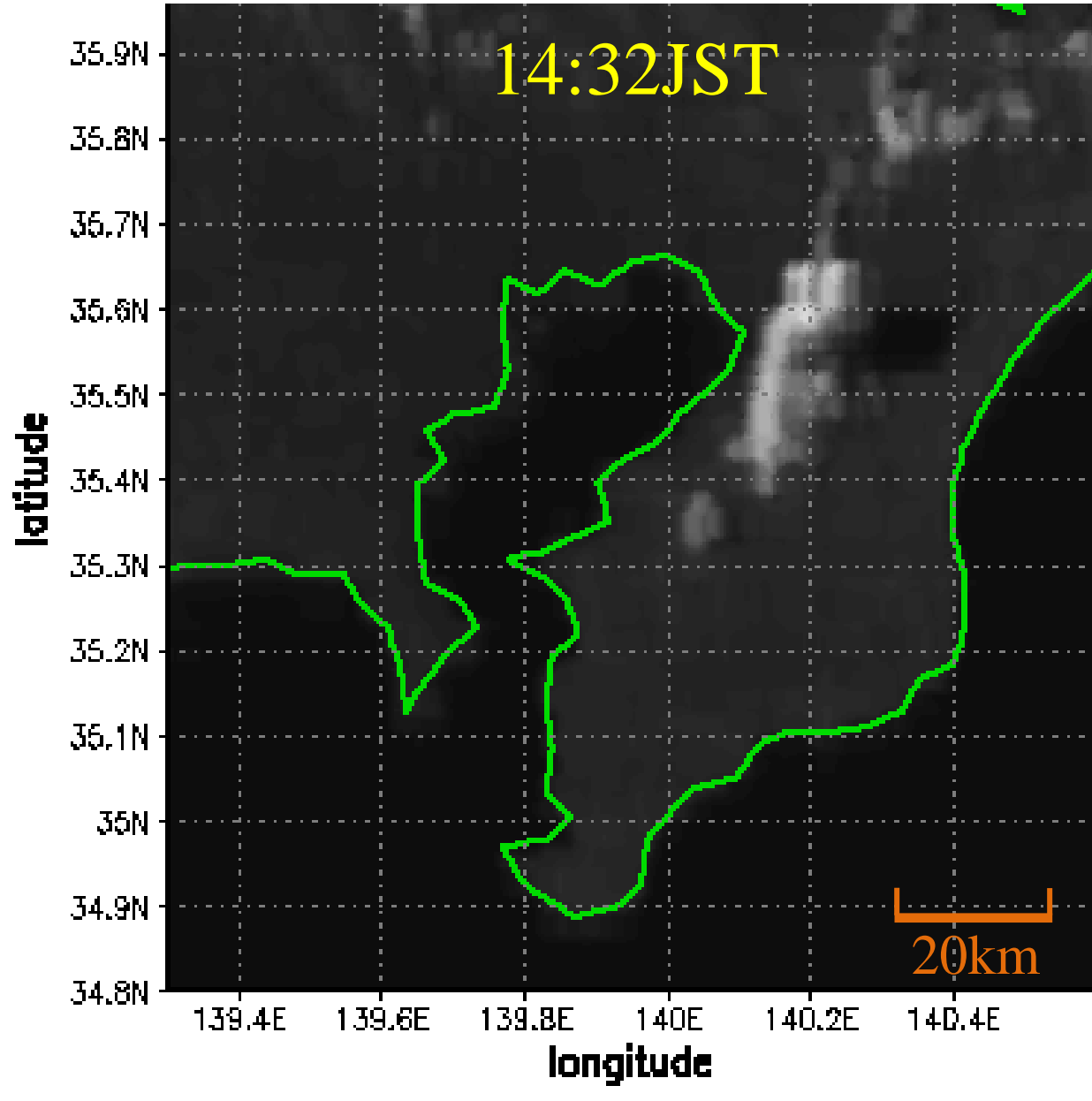
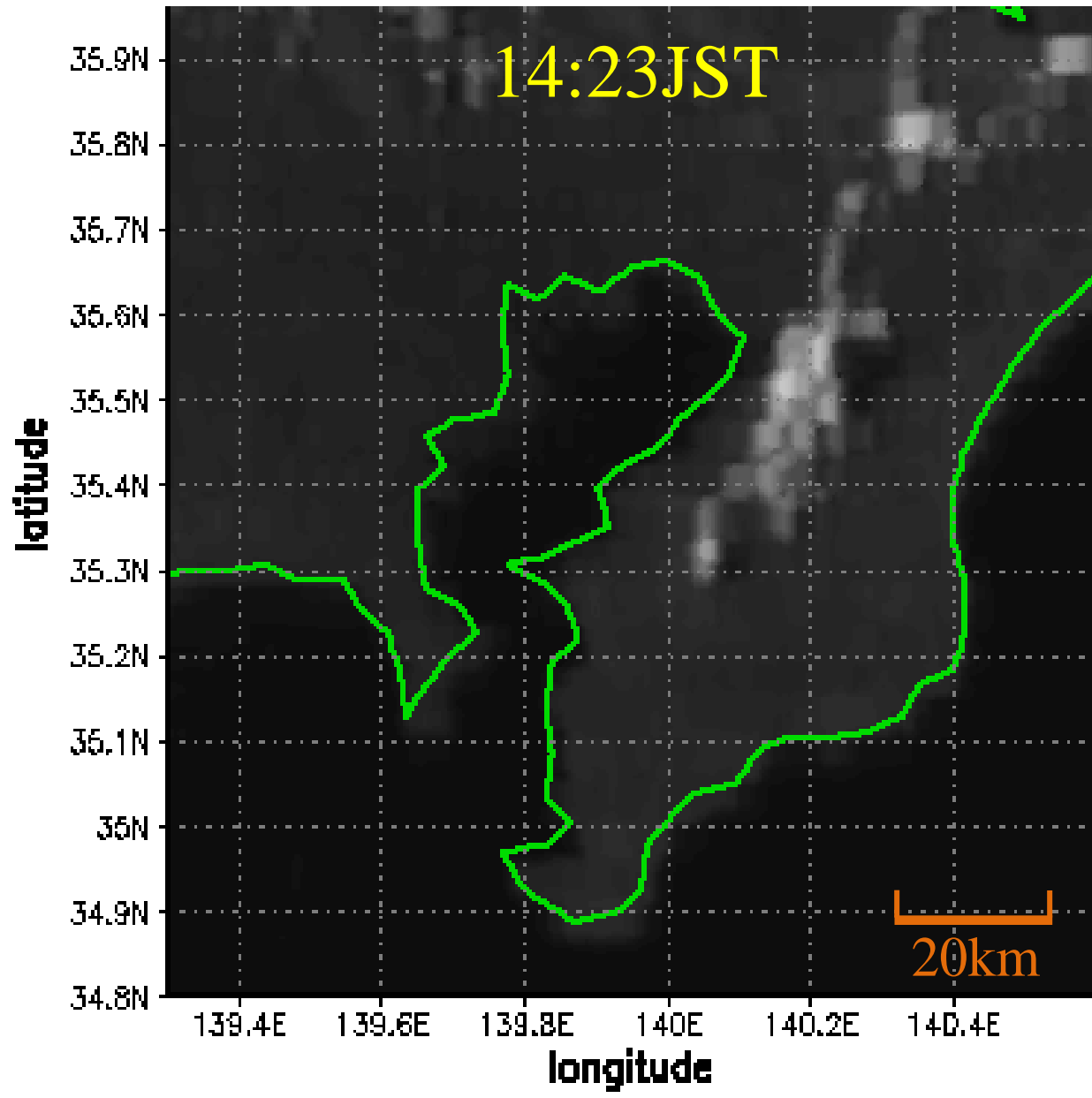
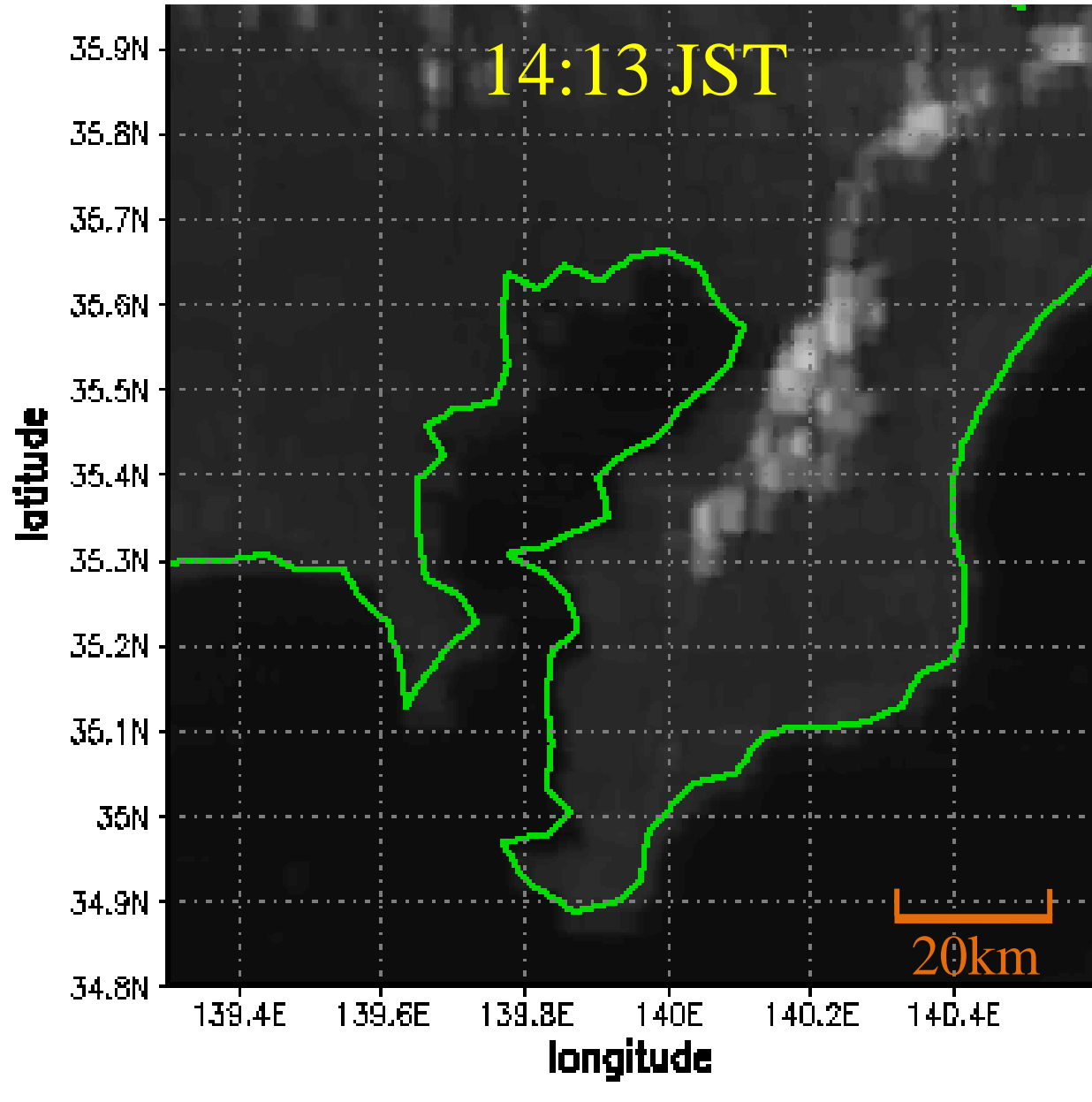
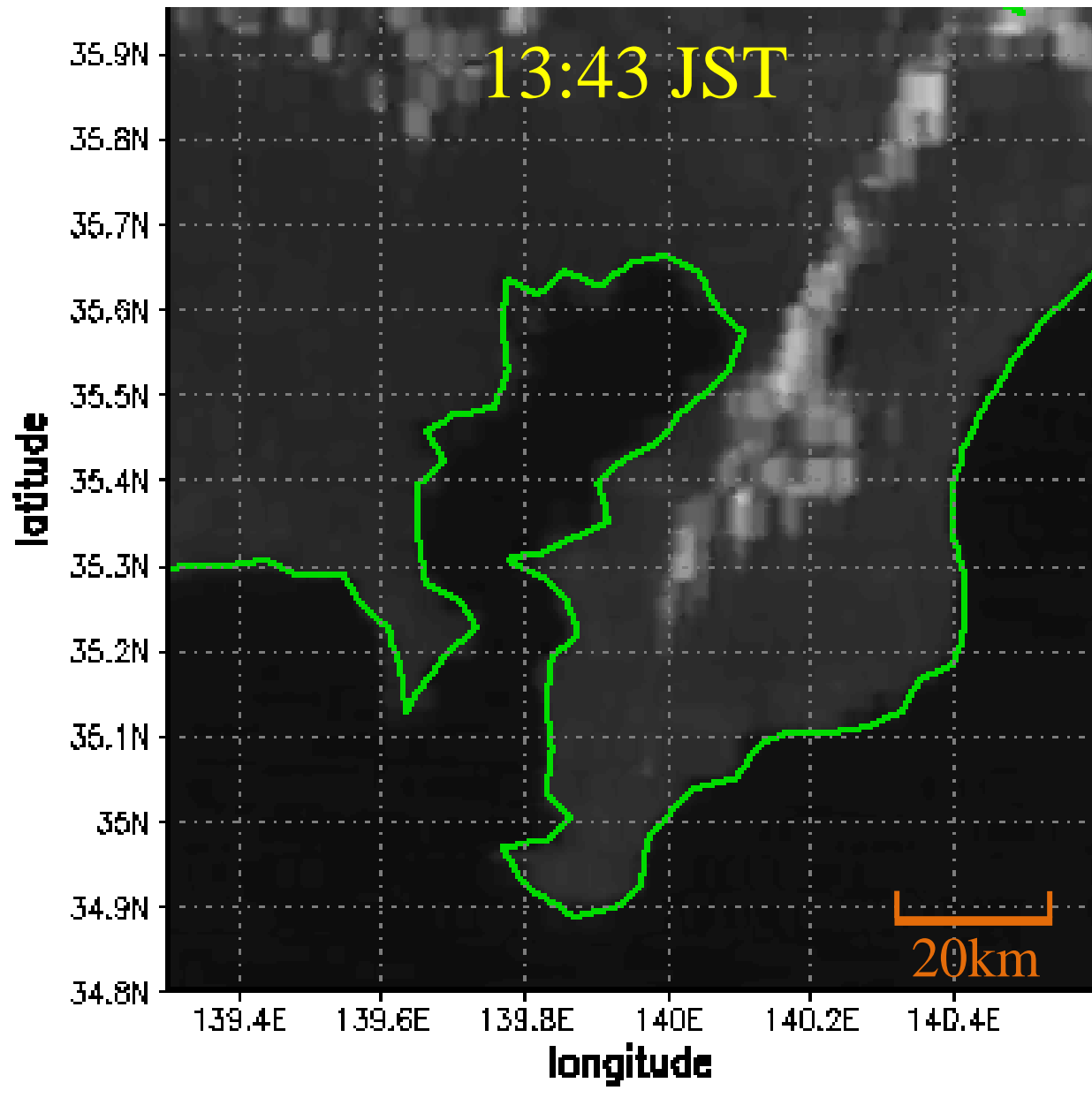
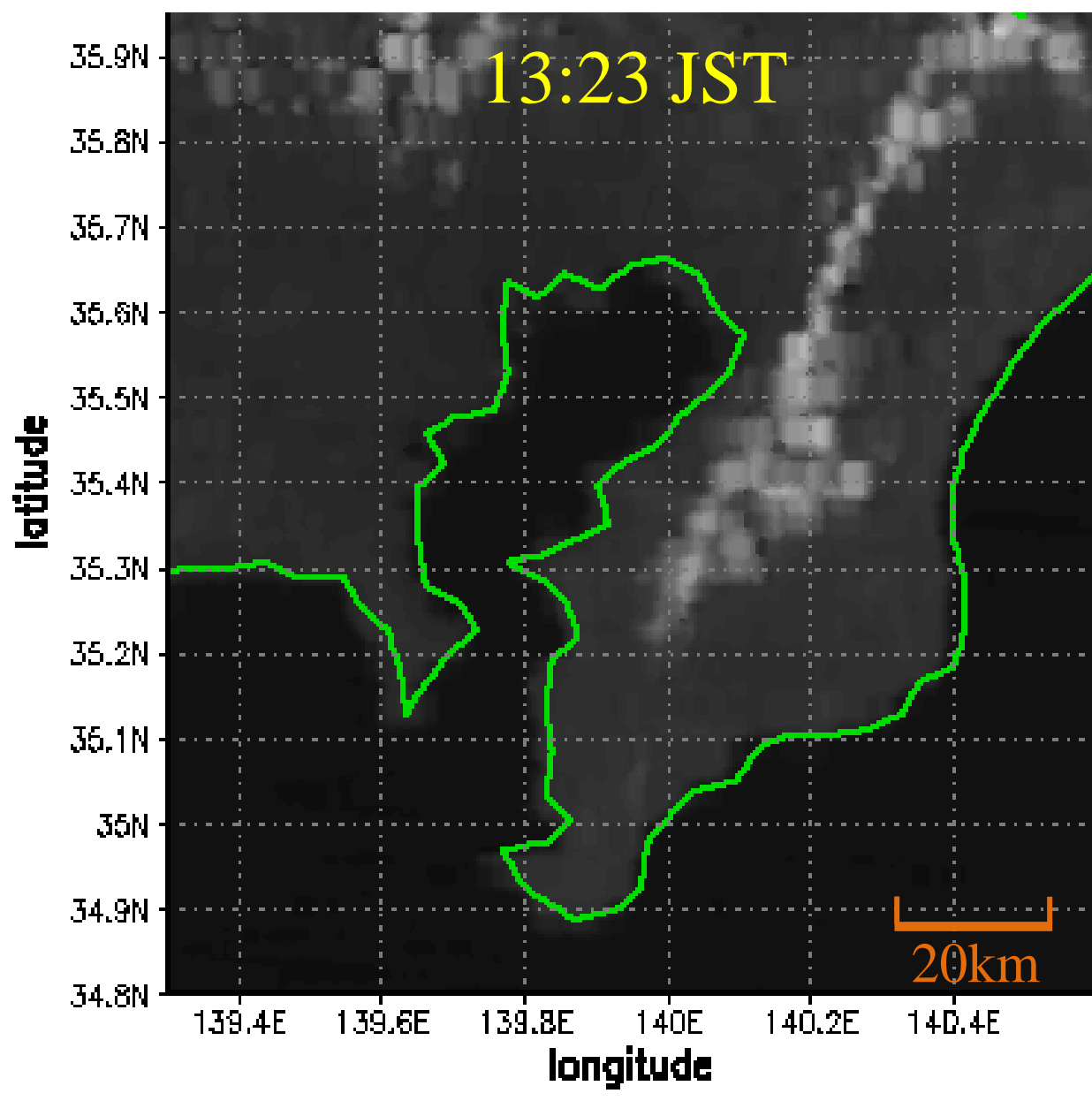
Visible image



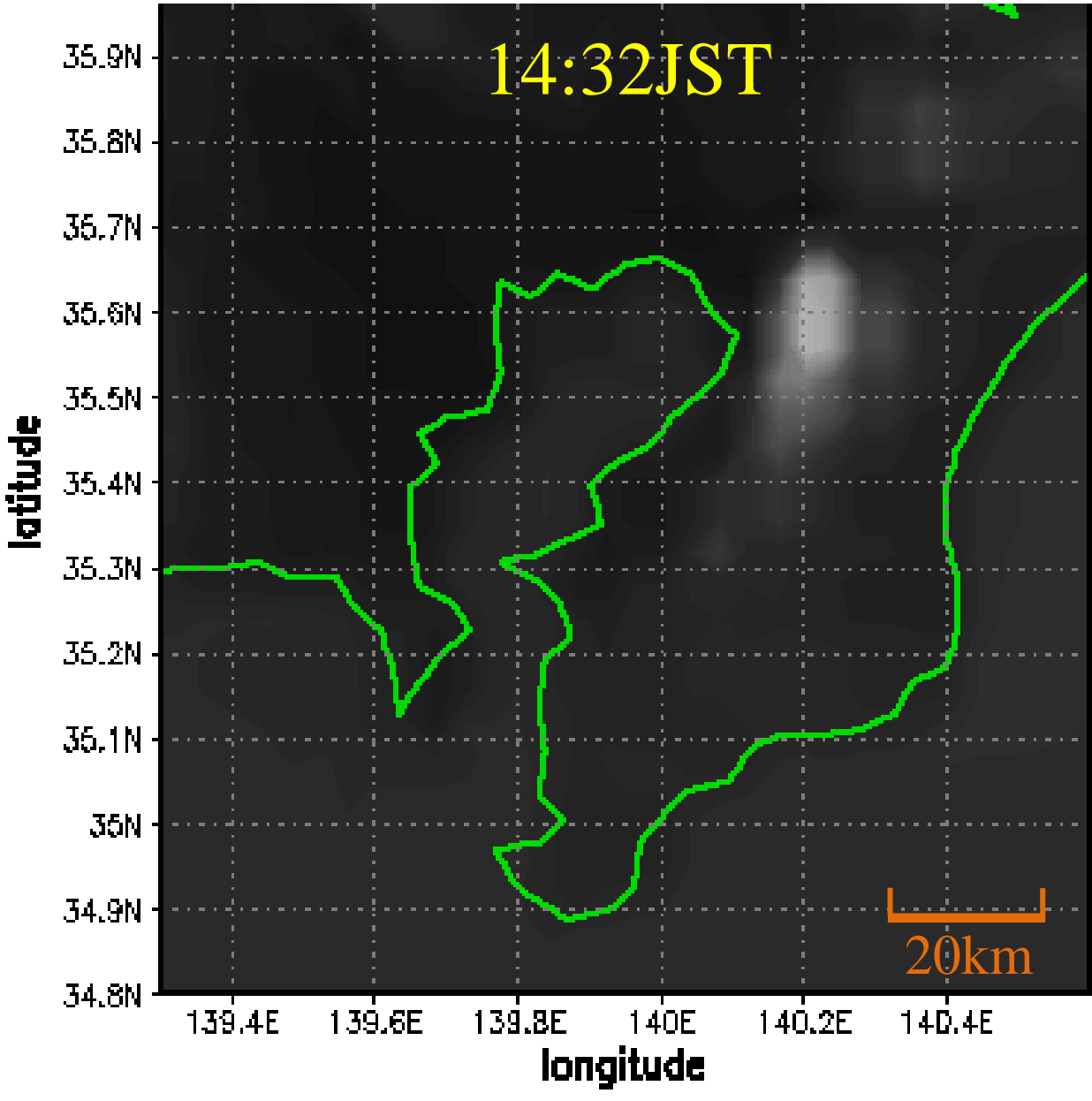
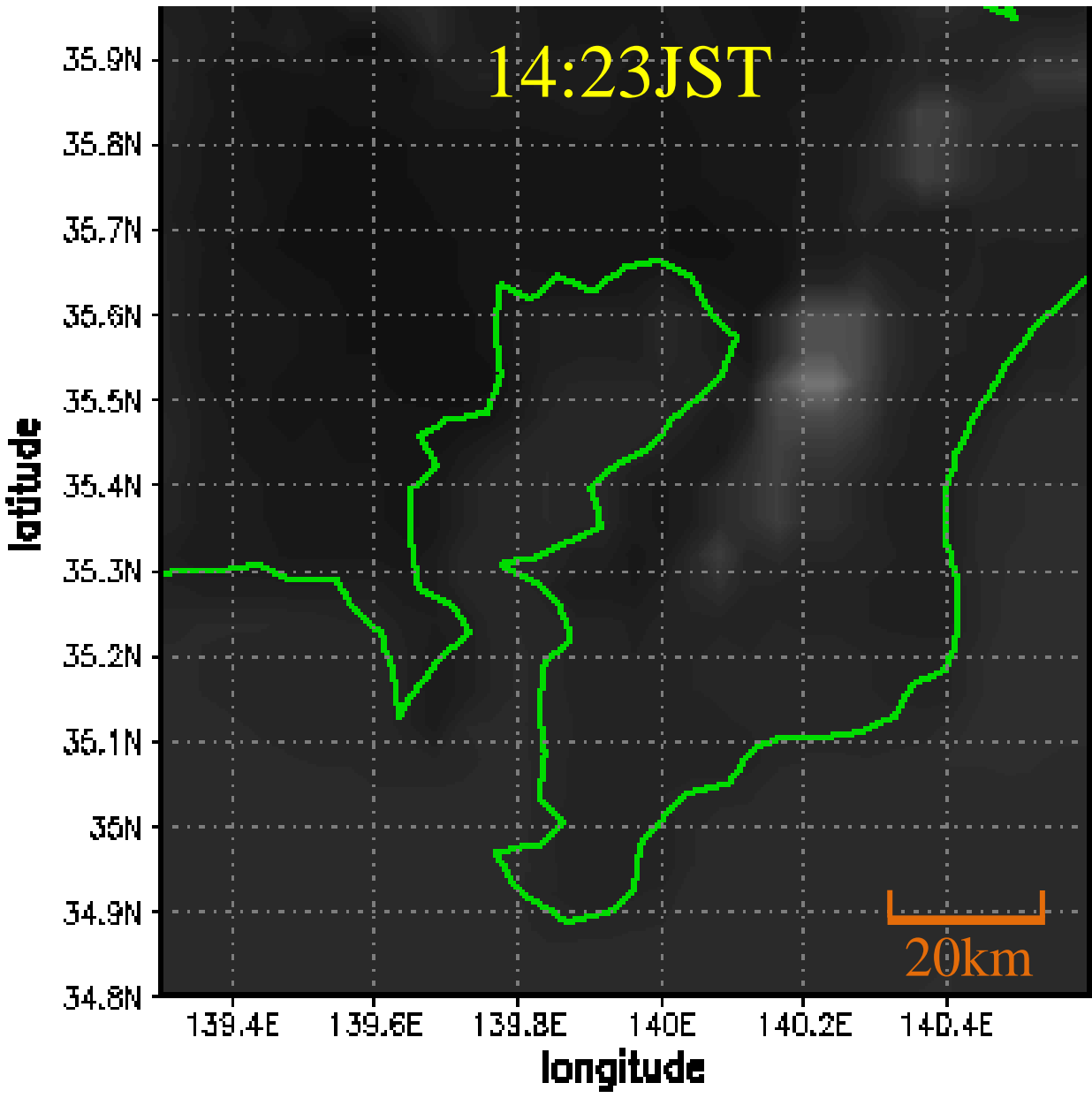
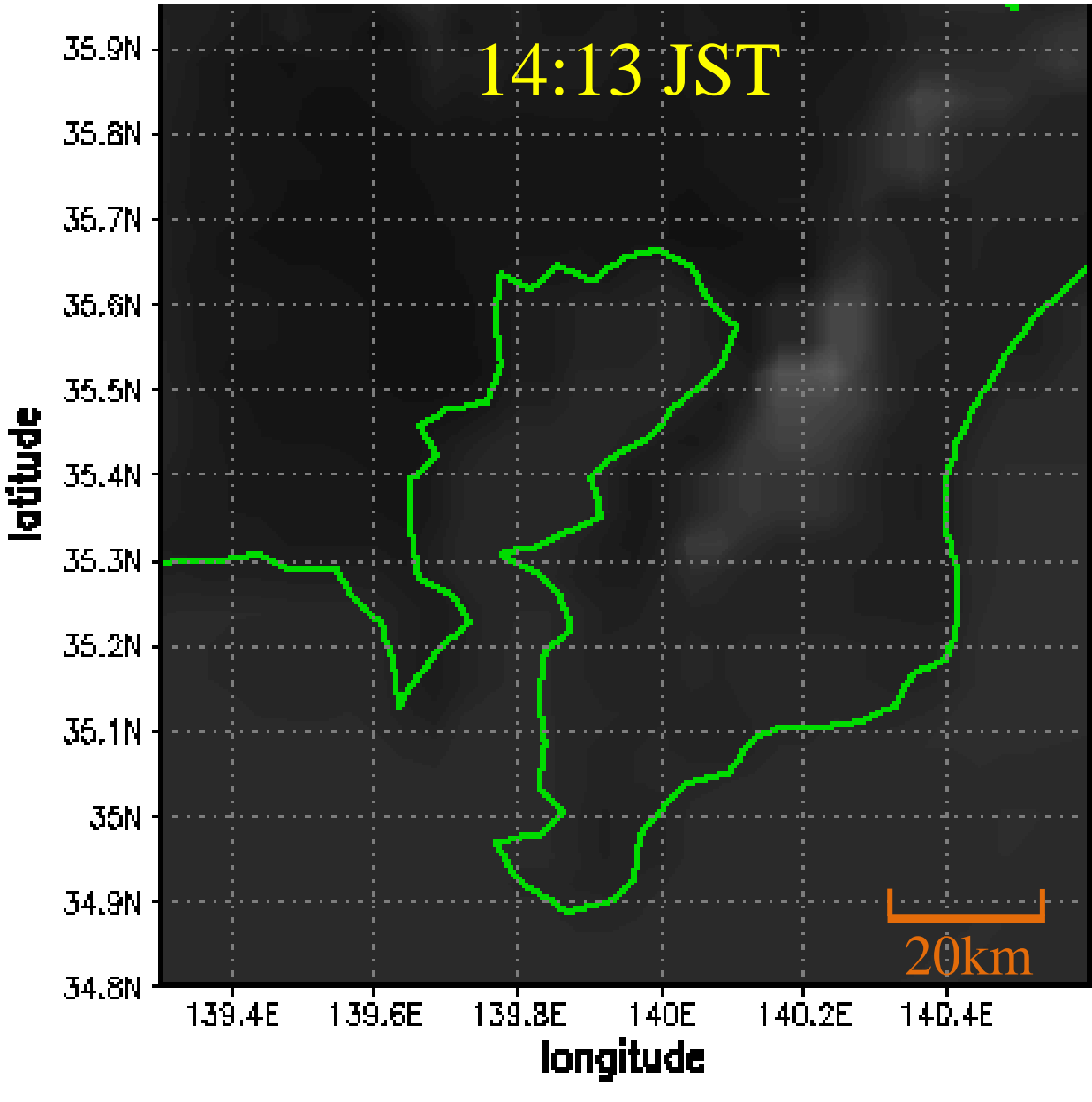
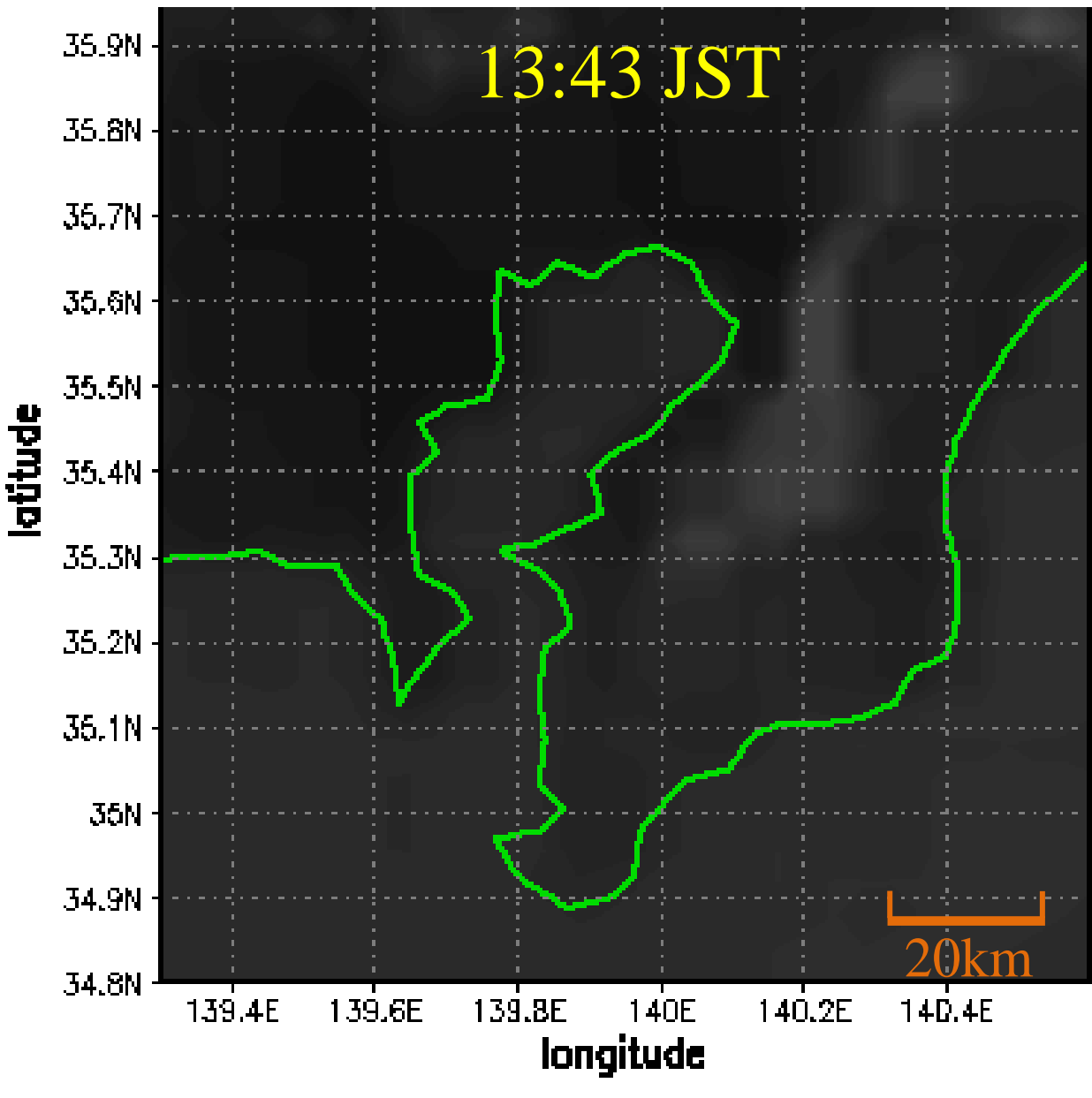
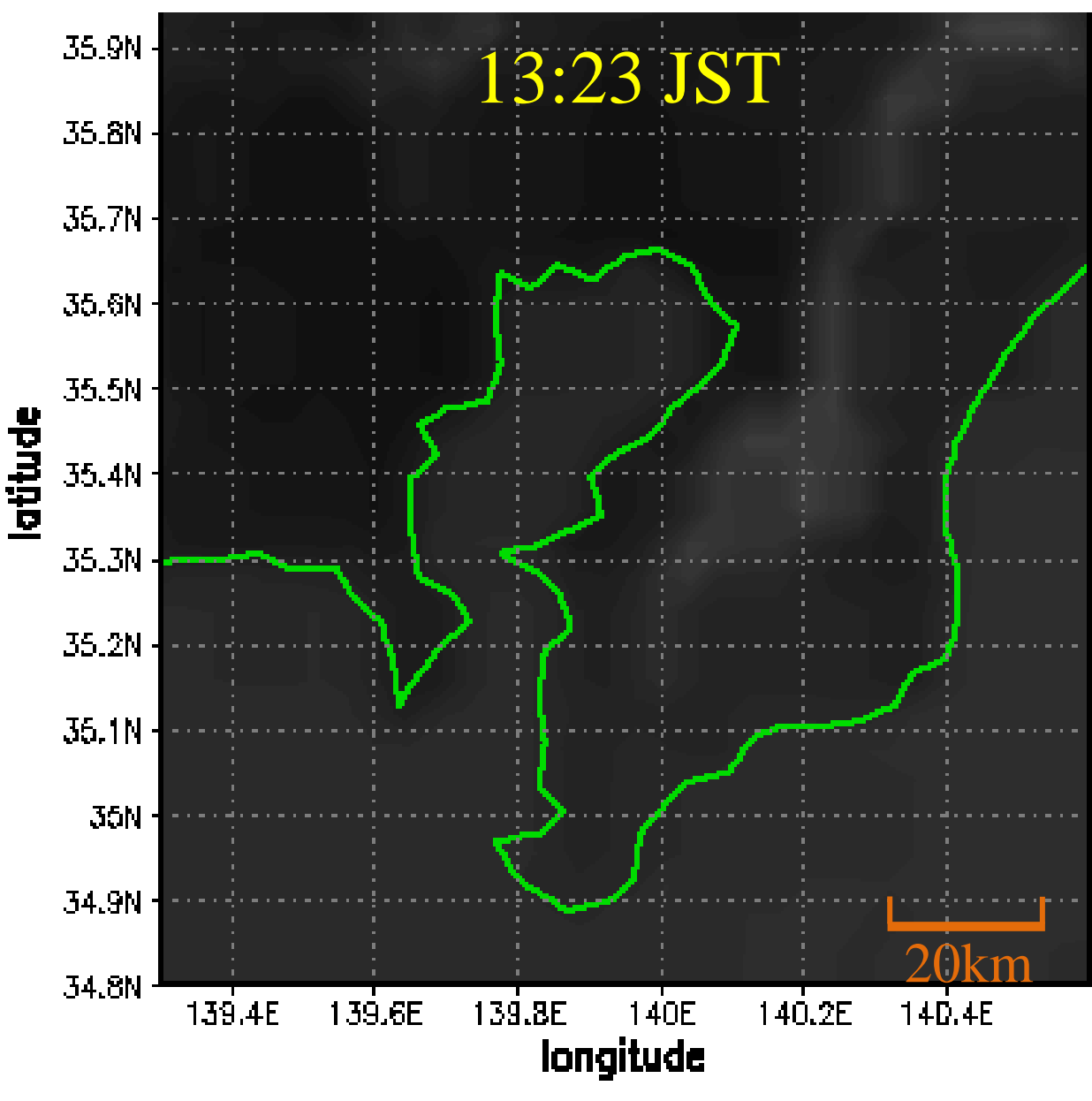
Radar intensity

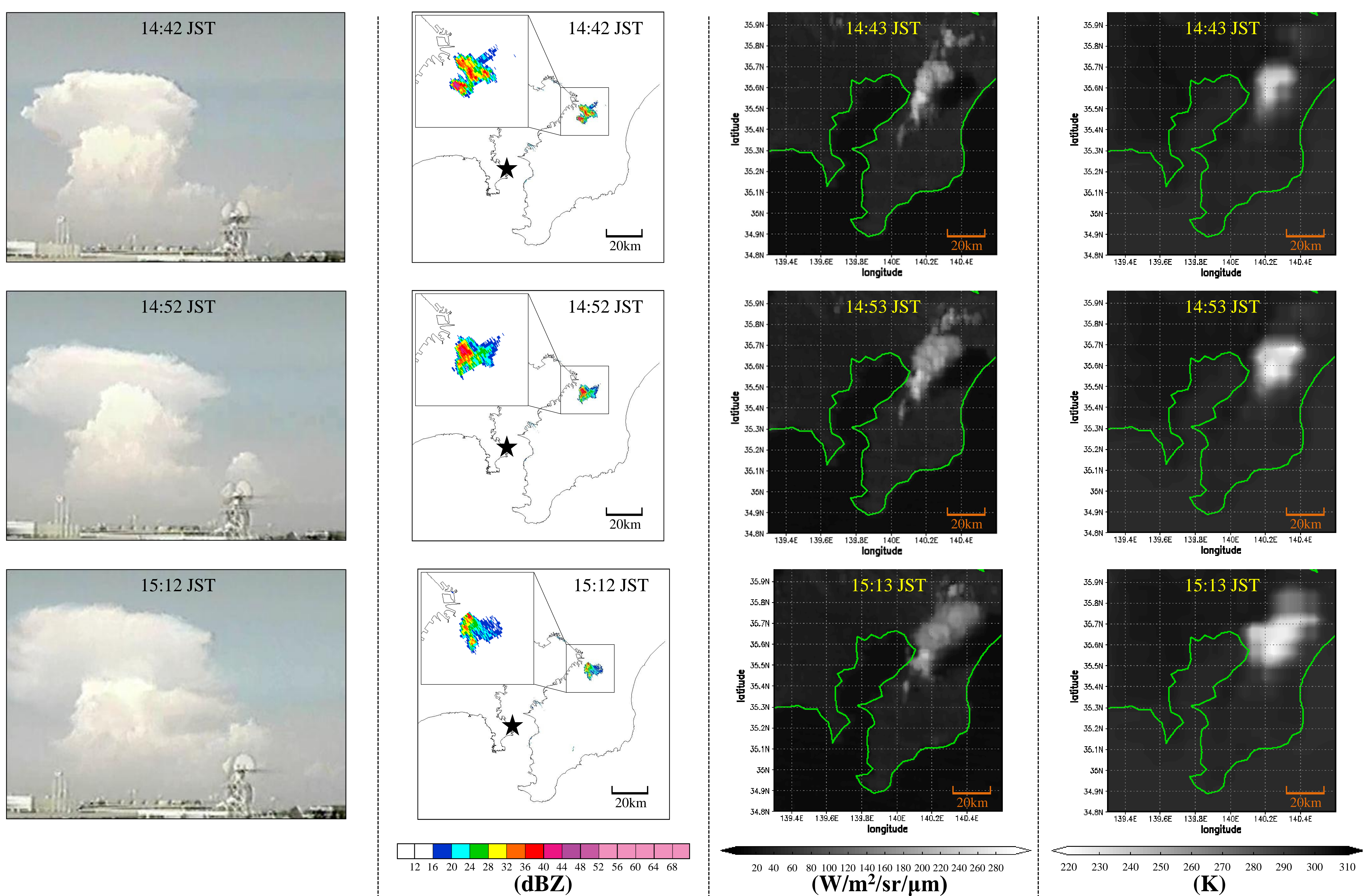


Visible radiance

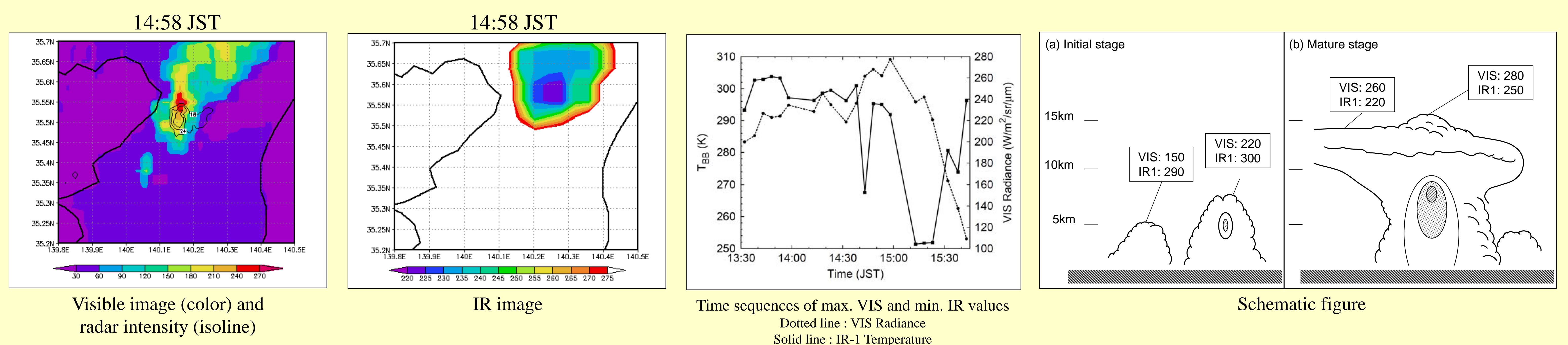


IR-1 temperature





Relationship between Cb evolution and raid scan data



Summary

Simultaneous observations of cumulonimbi using the MTSAT-1R (rapid scan), the 95-GHz FM-CW cloud radar, the X-band radar, and photogrammetry were carried out during the summer of 2010 in the Kanto region, Japan to understand the convection initiation and the structure of heavy rainfall in the Tokyo metropolitan area.

The formation process of an isolated cumulonimbus which generated in the afternoon on a fine mid-summer day on 23 August 2010 was presented. An isolated cumulonimbus developed suddenly near the Chiba site after 13:30 JST on 23 August 2010. The first echo appeared at a height of 4 km AGL at 13:42 JST. After forty minutes from the cloud generation, Cb turrets developed vertically and an anvil formed at 14:42 JST. The lifetime of the cumulonimbus was approximately two hours.

The rapid scan data is useful for the observation of isolated cumulonimbi under the mid-summer days and the detection of cumulonimbus initiations. The features of the cumulonimbus analyzed by the rapid scan images are as follows:

- 1) At the formation stage of the cumulonimbus, cumulus and cumulonimbus are detected by the visible brightness data.
- 2) The temporal change of the visible brightness suggests the evolution of the cumulonimbus turrets.
- 3) The temporal and spatial structures of the anvil were presented.

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