

Characteristics of distribution and preceding surface conditions of cumulonimbus clouds appeared on Kofu Basin on a calm

SANO, Tetsuya^{1*} ; SUETSUGI, Tadashi¹ ; OISHI, Satoru²

¹International Reserch Center for River Basin Environment, University of Yamanashi, ²Research Center for Urban Safety and Security, Kobe University

On a calm summer day, cumulonimbus clouds often appear on complex terrains with the thermal induced local circulations. The appearance of such cumulonimbus clouds on a basin is not so frequent ordinarily. Once a cumulonimbus cloud appears on a basin, it often brings much rainfall in a short time, which becomes triggers of weather related disaster in urban city on a basin. However, the characteristics of the generation of cumulonimbus clouds on a basin and the conditions in a basin preceding the generation of them have not been known enough. In this study, for the example of above situation, we analyze the distribution of the appearance of cumulonimbus clouds on Kofu Basin and the conditions in Kofu Basin preceding the appearance of them.

The days of the appearances of cumulonimbus clouds on Kofu basin in a calm day confirmed by the observation of X-MP radar of University of Yamanashi (UYR) were 8 days out of 1 July to 30 September on 2012. Although the number of the events was limited, they brought large rainfall amount of 20 to 30 mm in an hour. The positions of the appearance concentrated from center to eastern side on Kofu Basin.

Before the appearance, south-southwesterly (SSW-ly) and southeasterly (SE-ly) surface wind was measured on western and eastern sides on Kofu Basin, respectively. When SSW-ly or SE-ly wind expanded to reach Kofu city that locates center of Kofu Basin, surface equivalent potential temperature (θ_e) increased. From The meso-scale objective analyzed data of Japan Meteorology Agency (JMA-MANAL) shows strong south-component wind with high- θ_e toward Kofu Basin from Suruga Bay through a valley connecting Suruga Bay to Kofu basin at the level of about 900 hPa. At the eastern side of Kofu Basin, strong east-component wind with high- θ_e crossing the mountains on the eastern side was appeared. Then, the south-component wind and the east-component wind formed horizontal convergence on Kofu basin. So, we consider that, the winds entering from the outer side of Kofu Basin, conditional instability intensified and horizontal convergence formed in Kofu Basin, which played a role as trigger of precipitating cell on Kofu Basin.

Keywords: Cumulonimbus cloud, Kofu Basin, Conditions preceding the appearance of a cumulonimbus cloud