2.31 CONVECTIVE CLOUDS OBSERVATIONS AND ANALYSIS WITH POLARIMETRIC RADAR IN THE QINGHAI-XIZANG PLATEAU

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Based on the data on July 30 and August 5, 2014 in Naqu region, Tibet, detected with the mobile C-band dual polarimetric radar (C-POL) and Chinese new generation weather radar in Naqu (CINRAD CD), two cases of hailstorm cell and its dynamical, microphysical and thermal characteristics are detailed demonstrated by means of dual Doppler radar wind field retrieval and dual polarization radar hydrometeor class identification technique. The convective cells mostly appear in the afternoon in the plateau region. Although the cells horizontal and vertical scales are small, they are frequent occurrence and rapid evolution, which generally last for dozens of minutes. In the RHI (range height indicator) images of ZH, ZDR and Class, the whole dynamic and microphysical process can be obviously seen in where the hydrometeor particles raise and grow up following the zero line and accompanying the echo intensity increase, then form a hail wall dropping down in the other side of main updraft after overtaking it. From the successive three RHI scan, the phases of particle change from wet snow to hailstorm during the evolution process in one convective cell. The height of the echo is lower and its intensity is very weak when the cell is just triggered. However, when a large amount of wet snows appear in region above the melting level, it always hints that the updraft is so strong that the wet snows are brought back to high levels while they has not completely melted in the air below the melting level. Through physical processes such as condensation, rime, and attachment, the wet snow can rapidly grow into hailstones in just over 10 minutes. During the re-condensation of wet snows, the unstable structures are promoted and the updraft and downdraft are strengthened further because of latent heat releasing. Therefore, if numerous wet snows appear in a newly generated weak echo region above the melting level, it usually indicates that the region occurs strong updraft and will develop rapidly to a strong cell. The configuration of wind field in different height levels obtained by 3D wind field inversion shows that the existence of wind shear not only provides horizontal rotation, but also accelerates the vertical circulation. This is conducive to the conversion of unstable energy to kinetic energy, and cells can develop rapidly.