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The Characteristic Analysis and Seismic Triggering Study of Dayao M6.2 and M6.1 Earthquake Sequences in 2003

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The high-resolution hypocenter locations of the mainshocks on 21 July(M6.2) and 16 October(M6.1) and their aftershock sequences are determined in Dayao, Yunnan in 2003 by using the double-difference earthquake location algorithm. The results show that the epicenters of two mainshocks are very close, the distribution of the aftershock sequence appear to be very linear, the distribution of earthquake sequence is very consistent with the focal mechanism, and both of the two mainshocks are nearly vertical right-lateral fault. Differently from most other double earthquakes in Yunnan area, the aftershock distribution of Dayao M6.2 and M6.1 does not appear to be conjugated distribution and appears to be in a line, and there are some stacks in two earthquake sequences, which is inferred that they are all controlled by a same fault. The distribution of aftershock is unsymmetrical distribution according to the mainshock location and appears to be unilaterally distribution. The aftershock of M6.2 centralize in the northwest of M6.2 and the aftershock of M6.1 centralize in the southeast of M6.1, moreover, the M6.1 earthquake appears to be another southeastern rupture due to the M6.2 earthquake on the same fault. The results of static Coulomb stress changes show that the earthquake on 21 July(M6.2) trigger apparently the earthquake on 16 October(M6.1), the two mainshocks have stress triggering to their off-fault aftershocks in different extent, and the M6.5 earthquake occurred on Yao'an in 2002 also triggered the occurrence of the two Dayao earthquakes. These static Coulomb stress changes are all bigger than 0.01Mpa. Moreover, we find that the hypocenter locations may have great influence on the result of static Coulomb stress changes. The study of seismicity triggering need more accurate focal mechanism and earthquake parameters. A big error existed in focal mechanism and hypocenter location will induce an ambiguous region triggered by earthquake and make us can not make a precise study in earthquake triggering. In our study, as we determined high-resolution hypocenter locations of mainshocks and aftershock sequences using the double-difference earthquake location algorithm and the distribution of earthquake sequence is very consistent with the focal mechanism, we think our results have high reliability.