

## July 2020 heavy rainfall in Japan: A numerical experiment using real-time river discharge

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In July 2020, persistent heavy rain caused by stationary atmospheric front hit Japan, and its resulting continuous rain for nearly a month updated the historical highest rainfall records in several stations, leading to serious river flood, landslide, and debris flow events. The original hindcast and forecast ocean circulation model had included the climatological discharge information of major rivers, which failed to represent extreme river discharge under heavy rainfall. The experiments were conducted using real-time river discharge information based on the JAXA CaMa-Flood model including 368 rivers in Japan. Two methods, the momentum flux and the virtual salt flux for injecting rivers were examined. The real-time river discharge improved the salinity bias in the near-surface waters. The freshening water changed the shelf circulation, and the far-reaching effect to hundreds of kilometers away from the shore was also represented. Passive particle tracking was conducted for examining the cross-shelf exchange. More particles departure from Bungo Channel and Tosa Bay went offshore in use of the real-time river discharge than that of the climatology discharge. Those released in Sato Inland Sea and Kii Channel showed the opposite tendency. The real-time river discharge not only changed the coastal salinity distribution but also the coastal and offshore currents. The role of the real-time river discharge on drought events, and its influence on a longer time scale remained to be explored.