

Effects of geology, anthropogenic activities and heavy rain caused by a typhoon on stream water chemistry in Tenryu River, Shizuoka prefecture

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In order to elucidate the effects of geology, anthropogenic activities and heavy rain caused by a typhoon on stream water chemistry, we investigated the elemental compositions of stream water in Tenryu River, Shizuoka prefecture. We collected stream water at 18 sites of the mainstream and 16 sites of the tributaries from August 7 to 9, 2017. Typhoon number 5 that occurred on July 21, 2017 passed near study area at midnight on August 7.

The major ionic concentrations of stream water showed constant values in the downstream of Tenryu River. This result indicates that the effects of the tributaries, tidal and anthropogenic activities on stream water chemistry in the downstream are insignificant.

The stream water was enriched in Ca^{2+} and HCO_3^- , indicating that these ionic compositions are originated mainly from geological inputs from the upstream drainage region. The change of major ionic concentrations in the upper stream water demonstrates the effect of the tributaries and the dam discharge water is significant. The concentrations of Al, Fe, Mn and Ti increased in the upper stream collected after the typhoon. This result suggests that these elements were derived from those included in soil and sediment.

The typhoon provided the effect on stream water chemistry. The main stream water collected before and after the typhoon were enriched in Ca^{2+} and HCO_3^- , indicating that the effect of the typhoon on major ionic compositions was insignificant. Major ionic concentrations of stream water in the downstream collected after the typhoon were lower than those collected before the typhoon, which is caused by flowing of heavy rain and dilution. The concentrations of Al, Fe, Mn and Ti of stream water in the downstream collected after the typhoon was higher than those collected before the typhoon, which is caused by input of those elements included in suspended soil and sediment.

Keywords: Tenryu river, typhoon, major ionic composition, trace elemental concentration