



## **Hydrometeorological variability and its local impacts over the Han River Basin during different El Niño phases**

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Changes in global climate systems have significant consequences for water resources, which are closely associated with weather in the short term and climate phenomena in the long term. This study analyzed the variations in hydrologic variables during spring and summer period in the Han River Basin during different ENSO (El-Niño/Southern Oscillation) events, associated with the conventional cold-tongue (CT) and warm-pool (WP) El Niño phases, which dominate global changes in atmospheric circulation patterns and hydrologic environments (such as precipitation and runoff). During WP El Niño years, rainfall in spring and its coefficient of variation were higher than in normal years. Moreover, during conventional CT El Niño years, summers tended to be drier than in climatologically normal years, although variability in precipitation during summer was relatively lower. Data for runoff showed wetter springs during both types of El Niño events as compared to long-term normal years and significant changes in runoff during summer under CT El Niño conditions. During WP El Niño years, increased runoff was seen for 95.8% of all basins and this increase was statistically significant for 58.3% of these basins, but variability in runoff was small. These findings will confirm that water resources during spring and summer in the Han River Basin, Korea, are very sensitive to different El Niño events. Thus, further research to understand climate factors and correlations and hydrologic variables is essential for efficient long-term water resource prediction and management, especially for basins like the Han River Basin, where seasonal variations and uncertainties are high.