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Abstract : Rainfall erosivity is a critical factor affecting soil erosion and agricultural productivity. This study aims to analyze rainfall erosivity in the northern region of Algeria using a hybrid approach that combines empirical and modeling techniques. The primary objectives are to identify homogeneous regions, assess their susceptibility to climate change, and determine the wet and dry periods impacting the study area. Additionally, the modified Fournier Index (MFI) is calculated over 76-years (1941–2016) using data from 33 pluviometric stations. The results reveal distinct wet and dry periods in the study area, with abundant rainfall occurring in winter/autumn and spring, followed by a summer drought. The northern region exhibits high erosivity levels, ranging from severe to very severe, while the southeast and other regions experience low to moderate erosivity. Region 4 demonstrates the highest rain aggressiveness and moderate to severe erosion throughout the study period. Spatial analysis shows an increasing MFI gradient from west to east and south to north. Furthermore, the study establishes a positive correlation between MFI and the Southern Oscillation Index, indicating that El Niño and La Niña have a significant influence on sedimentary production. Overall, this research provides valuable insights into rainfall erosivity patterns in Northern Algeria, aiding in the identification of high-risk areas and supporting sustainable land management strategies.

Key words : Climate signals, La Niña, northern Algeria, R, seasonal rains, SOI.

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