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The title (العنوان):

The new 'surface storage' concept versus the old 'sponge effect' concept: application to the analysis of the spatio-temporal variability of the annual daily maximum flow characteristics in southern Quebec (Canada)

The paper document Shelf mark P23-08 :(paper version not available)

APA Citation (توثيق APA):

, Boufekane Abdelmadji, Busico Gianluigi, et all. (2023) . The new 'surface storage' concept versus the old 'sponge effect' concept: application to the analysis of the spatio-temporal variability of the annual daily maximum flow characteristics in southern Quebec (Canada). *Journal of Water and Climate Change*, vol 14 (n°8) , p. 2543–2563. DOI ou URL : <https://iwaponline.com/jwcc/article/14/8/2543/96889/The-new-surface-storage-concept-versus-the-old>

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كل الحقوق محفوظة للمدرسة الوطنية العليا للري.

Abstract : This study confronts the new concept of ‘surface storage’ with the old concept of ‘sponge effect’ to explain the spatio-temporal variability of the annual daily maximum flows measured in 17 watersheds of southern Quebec during the period 1930–2019. The new concept takes into account the hydrological impacts of wetlands and other topographic components of the landscape (lakes, depressions, ditches, etc.) while that of the sponge effect only takes into account the hydrological impacts of wetlands. With regard to spatial variability, the area of wetlands and other water bodies is the variable best correlated negatively with the magnitude but positively with the duration of flows. As for the temporal variability, the application of the long-term trend tests revealed a significant increase in the magnitude and, to a lesser extent, the duration of the flows occurring in the watersheds of the north shore characterized by a greater area of wetlands and other water bodies (.5%). This increase is explained by the fact that the storage capacity of these land types, which remains unchanged over time, does not make it possible to store the surplus runoff water brought by the increase in rainfall during the snowmelt season.

Key words : Duration, Floods, L-term trend, Magnitude, Sponge effect concept, Surface Storage concept

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