Pedro Sanzana (24/04/2018)
Caractérisation et modélisation des processus hydrologiques dans les bassins périurbains du piémont de la ville de Santiago (Chili)
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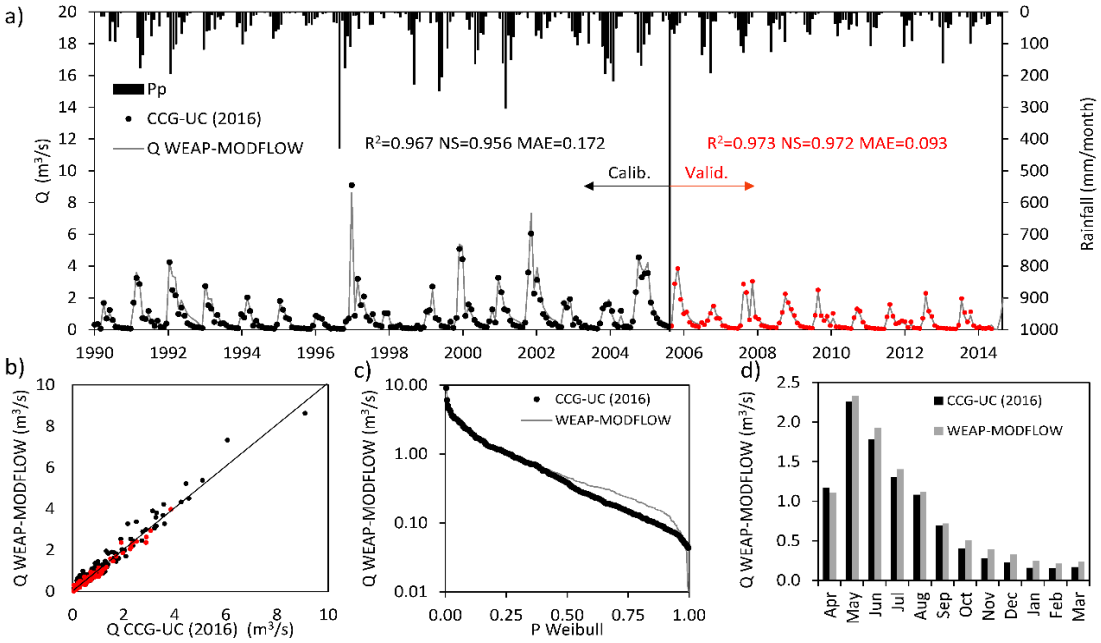
On a développé un ensemble d'outils géomatiques permettant la représentation de la modification des écoulements par l'urbanisation au sein des modélisations hydrologiques distribuées.

L'objectif scientifique est d'examiner le comportement de territoires en transformation progressive.

Le couplage obtenu a permis d'examiner deux petits bassins periurbains en France et au Chili et les conditions de recharge de l'aquifère Dehasa (Chili)

Urban growth implies land use changes with natural and agricultural lands becoming urbanized. Distributed hydrological modelling of periurban basins requires an accurate spatial representation to take into account all these features and landscape changes. In this work we propose Geo-PUMMA, a set of GIS tools programmed in Python for GRASS that uses irregular meshes to explicitly represent the different components of the peri-urban terrain, particularly the elements affecting the flow paths (i.e. stormwater facilities, channels, streets and pipes). Geo-PUMMA gathers a series of geographical data treatment procedures which use spatial information maps (e.g. cadastral, soil types, geology and digital elevation models) to produce Hydrological Response Units (HRU) and Urban Hydrological Elements (UHEs) that make up a terrain representation more suitable for hydrologic modeling. Geo-Pumma was applied to 2 peri-urban catchments: the Mercier catchment (OTHU observatory, France) and the Estero El Guindo catchment (Chile). Geo-Pumma produces a terrain representation that is more representative of the actual drainage structure (Sanzana et al., 2017, 2018).

A coupled distributed hydrological model (WEAP) was also coupled with a groundwater model (MODFLOW) at the regional scale, to better assess the recharge to the groundwater of the Dehasa aquifer located in the Andean piedmont close to Santiago city. The model was calibrated using observations at the small experimental catchment scale (discharge) and at the regional scale (groundwater level) (Fig.1, Sanzana et al., 2019), showing the impact of inefficient irrigation of gardens on groundwater recharge.



Comparison of flows simulated by the coupled WEAP–MODFLOW vs. the reference model (CCG, 2016). (a) monthly series for the calibration and validation periods, (b) correlations between monthly values for both calibration and validation periods, (c) flow duration curves, and (d) monthly average streamflows. (Sanzana et al., 2019)

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Publications :

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