EGU2020-8394
https://doi.org/10.5194/egusphere-egu2020-8394
EGU General Assembly 2020

Validating the French hYdrometeorological REanalysis (FYRE) with documentary evidence

Jean-Philippe Vidal[1], Alexandre Devers[1], Claire Lauvernet[1], Olivier Vannier[2], Laurie Caillouet[2], Eric Sauquet[1], and Benjamin Graff[2]

[1]INRAE, UR RiverLy, Villeurbanne Cedex, France (jean-philippe.vidal@inrae.fr)

[2]CNR, 2 rue André Bonin, 69316 LYON, France

The recently developed French hYdrometerological Reanalysis (FYRE) covers the period 1871-2012 and provide high-resolution ensemble reconstructions of both climate and hydrology over France. FYRE Climate combines a statistical downscaling of the global Twentieth Century reanalysis (Caillouet *et al.*, 2019) with in-situ station observations through Ensemble Kalman filter (EnKF) data assimilation (Devers *et al.*, 2020). FYRE Climate is composed of 25 members of daily temperature and precipitation fields on a 8~km grid over France. It served as forcings for a conceptual hydrological model over 661 near-natural catchments to build streamflow reconstructions spanning 142 years. These reconstructions have then been combined with historical streamflow observations, again through EnKF data assimilation, to build the FYRE Hydro 25-member daily hydrological reanalysis over the 661 catchments.

FYRE Hydro is here validated with various types of documentary evidence (poem, complaint letter, and photograph), focusing on extreme low-flow events and their spatial and temporal fingerprint. They serve as examples of naturally extreme hydrological events that are exacerbated through human interventions, the magnitude of which has yet to be consistently quantified over the course of the Anthropocene.

References

Caillouet, L., Vidal, J.-P., Sauquet, E., Graff, B., Soubeyroux, J.-M. (2019) SCOPE Climate: a 142-year daily high-resolution ensemble meteorological reconstruction dataset over France. *Earth System Science Data*, 11, 241-260. https://doi.org./10.5194/essd-11-241-2019

Devers, A., Vidal, J.-P., Lauvernet, C., Graff, B., Vannier, O. (2020) A framework for high-resolution meteorological surface reanalysis through offline data assimilation in an ensemble of downscaled reconstructions. *Quarterly Journal of the Royal Meteorological Society*. https://doi.org./10.1002/qj.3663