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Recalculation of historical flood flows recorded on hydrometric stations and impact assessment

Arnaud Belleville, Amelie Tacnet, Damien Sevrez, Alexandre Hauet, and Thibault Mathevet
EDF DTG, Water Resources Department, GRENOBLE, France (arnaud.belleville@edf.fr)

For safety reasons, energy production or regulation, water resources management is one of EDF's (Electricité de France) main concerns. To meet these needs, since the fifties EDF-DTG (Division Technique Générale) has operated a hydrometric network that includes more than 350 hydrometric stations. The process of producing streamflow series involves a succession of steps: acquisition of raw water level data, validation of these data, gauging operation, tracing of the rating curve, discharge calculation, criticizing and data banking.
The archiving of a discharge time series into a database after the validation and criticizing phase is often considered by the field hydrologist as the final step in the data production process. However, during the subsequent valorization of these data in the context of hydrological studies (calibration of hydrological models, flood forecasting and warning, engineering design, etc.), new knowledge relating to the hydrometric station (high-flow gauges, hydraulic modeling, etc.) may be available and lead to the need to update discharges via the updating of the rating curves.
The paper proposes a methodology to update historical flood flows, so as to propose homogeneous and less biased data. For a sample of selected floods for a hydrometric station, discharge is recalculated from the water level series and: (i) from the most recent operational rating curve (which is supposed to integrate the most complete expertise from the field hydrologist); (ii) from the rating curve taking into account data derived from hydraulic modeling, provided by a major program of survey and hydraulic modeling for EDF hydrometric stations network.
This methodology is then applied to a large hydrometric stations panel (more than 80). Three datasets are then produced for each station: (i) historical flood flows (available in database); (ii) flood flows recalculated from the last operational rating curve; (iii) flood flows recalculated from the rating curve from hydraulic modeling. The impact on flood flow deviations is analyzed. Some trends in link between floods over (under) estimation and high flow hydraulic controls (overbank flows, back flows...) are discussed.
In terms of perspectives, a reflexion can be made on the role of the field hydrologist in relation to the hydrologist using these data, on the interest of inscribing these recalculations of stream flow series in a perennial and systematic approach. The question of the valorization and the traceability of such studies is also asked.