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The Video Globe Challenge 2020, a video streamgauging race during the Covid-19 lockdown

Jérôme Le Coz¹, Alexandre Hauet², and Aurélien Despax³

¹INRAE, Lyon, France

²EDF, Grenoble, France

³CNR, Lyon, France

The strict lockdown imposed by the Covid-19 health crisis motivated the French-speaking hydrometry network Groupe Doppler Hydrométrie (GDH) to organise a new type of hydrometric intercomparison, based on video gauging. Between 15 April and 10 May 2020, the Video Globe Challenge 2020 was run in 8 stages corresponding to 8 videos taken from the ground (5 cases) or from a drone (3 cases), each coming with a reference discharge measurement (6 ADCP gauging, 1 dilution gauging, 1 calibration curve). These eight cases present various flows, measurement conditions and operating difficulties. The data were provided by EDF, DREAL Auvergne-Rhône-Alpes, NVE (Norway) and DNRME Queensland (Mark Randall, Australia).

For each stage, around 25 competitors participated by submitting their discharge result, their surface velocity coefficient (a.k.a alpha) estimate and their parameters, with the hope of getting as close as possible to the reference discharge. Several velocimetry techniques and software tools were used: from visual spotting and manual processing, in Flowsnap (Tenevia), Excel or Barème, to specialised software, mainly Fudaa-LSPIV (EDF/INRAE) but also SSIVSuite (Photrack), PIVlab, and Opyf (EPFL/INRIA, local optical flow). The general classification (smaller sum of percentage deviations to discharge references), points classification (smaller sum of ranks), sniper classification (best visual velocimetry) and young rider classification (for students) awarded the yellow, green, polka dot and white jerseys, respectively.

The Challenge 2020 has been rich in lessons, notably by illustrating several important sources of error for video gauging and the possible parries that the user can deploy (or not...). The exercise was as useful for training and coaching the participants (often beginners) as it was for identifying the improvements to be expected in procedures and software. The results highlight some operator-related error sources which need to be minimized by developing more guided or automated parameter settings, and more robust velocimetry algorithms. They also illustrate the typical uncertainty levels of such measurements.

The cultural aspects were not left out, revealing historical facts and hydrometry-related feats about the rivers visited, e.g. Julius Caesar wading the river to join the druids in the sanctuary of Seranos, Viking Stør Åne the Blue breaking the ice cover to prevent rating shift, or Sir Herbert inventor of the anti-crocodile waders. The official history of hydrometry conceals many

unsuspected mysteries that have yet to be revealed...