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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Informing a hydrological model of the Ogooué with multi-mission remote sensing data" *by* Cecile M. M. Kittel et al.

Anonymous Referee #1

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This paper is of a great interest to the community of hydrologists in Africa. It is a first attempt to estimate the seasonnal river discharge and its interrannual variability of the Ogooue River in Gabon, from satellite data only. The main interest of this project is to build simulated water heights and discharge time series for virtual gauging stations along the river course, while discharge observed time series end in 1984 for most of the stations, and rainfall data are also difficult to update. The satellite data and the methods used are validated against some in situ data series, and show a good capacity to simulate coherent discharge time series for most of the stations, even if the absolute precision remain of several tenth of cm, which is still difficult to use for real time operational alerts. The paper is well organised and written, and the illustrations are appropriate. I only recommend some minor corrections to clarify some points,

enlarge the references list to a few uncited papers related to the core of the study (at least Mahe et al. 1990, see below), and correct some minor errors. Detailed remarks. Some paragraphs are written in bold, to modify. P1 Lines 16-17: the abstract indicates that this study is the best current baseline characterization of hydrological conditions in the Ogooué river. It is partly true, if you consider the previous publication of Mahe et al. 2013 which shows monthly discharges for the Ogooue river over the period 2000-2007 in regard of previous periods until 1990 (the 90's are missing time series). P 2 Line 27: accuracy between 30 and 70 cm: can the author estimate the discharge value error considering this height margin? P 3 Lines 25-29: About the previously used models, lumped models have proved less efficient to represent the two annual flood peaks of equatorial rivers, mainly due to a very approximative estimation of PE (Paturel et al 2003) (Dezetter et al 2008) Paturel, J.E., Ouedraogo, M., Mahe, G., Servat, E., Dezetter, A., Ardoin, S. (2003). The influence of distributed input data on the hydrological modelling of monthly river flow regimes in West Africa. Hydrological Sciences Journal, 48, 6, 881-890. Dezetter, A., Girard, S., Paturel, J.E., Mahé, G., Ardoin-Bardin, S., Servat, E. (2008). Simulation of runoff in West Africa: Is there a single data-model combination that produces the best simulation results ? Journal of Hydrology, 354, 203-212.

P 4 Line 29: Hydrological monitoring efforts "by ORSTOM hydrologists during the 50's to the 80's" P 4 Line 30: "...available informations are from 1984" for most stations, (Mahe et al., 1990; 1994) Mahé, G., Lerique, J., Olivry, J.C. (1990). L'Ogooué au Gabon. Reconstitution des débits manquants et mise en évidence de variations climatiques à l'équateur. Hydrologie Continentale, Ed. ORSTOM, Paris, 5, 2, 105-124. Mahé, G., Delclaux, F., Crespy, A. (1994). Elaboration d'une chaîne de traitement pluviométrique et application au calcul automatique de lames précipitées (bassin-versant de l'Ogooué au Gabon). Hydrologie Continentale, 9, 2, 169-180. P 4 Libne 32: there is much more in the paper of Mahe et al. 2013 (update of the 1990's paper), for instance the dramatic reduction of the Spring flood at Lambarene since the 80's, confirmed during the 2000's as showed in the 2013's paper. P 5 Figure 1: the text in

white is difficult to read P 6 Line 7: historical precipitations at four locations: which ones? P 9 Figure 3: too small P 11 Line 1: the storage constants are fixed how? And at which value? P 11: 3.7 Watershed Delination: Why not used the existing delineation available at the SIEREM website? This site is cited by the authors, but it is difficult to know for what purpose it is cited. http://www.hydrosciences.fr/sierem/index_en.htm http://www.hydrosciences.fr/sierem/consultation/consultationgraphbas.asp?basid=OGOOUE http://www.hydrosciences.fr/sierem/produits/gis/Ogooue.asp free GIS files soil WHC for $\frac{1}{2}$ square degrees, from the FAO soil map of the world. Gives the water height for the upper soil layer. Please cite Boyer et al., 2006 to refer to SIEREM Boyer, J.F., Dieulin, C., Rouché, N., Crès, A., Servat, E., Paturel, J.E., Mahé, G. (2006). SIEREM: an environmental information system for water resources. In: Water Resource Variability: Hydrological Impacts. Proc. of the 5th FRIEND World Conference, La Havana, Cuba, IAHS Publ. 308, 19-25. P 19 Table 4: the capyion mentions number between parenthesis, but there are none in the table. Please clarify. P 19 Line 7: total water storage 70.6 and 83%. OK, but which part of this pcentage participates to surface runoff? P 25 Line18-19: there are more than a few decades of observations for the Ogooue river at Lambarene, the time series starts in 1929, and some missing years have been reconstructed. See Mahe et al. 1990 P 27 Line 6: OK to thank SIEREM, but the authors should refere to the Boyer et al 2006 paper (see up)

Please also note the supplement to this comment:
https://www.hydrol-earth-syst-sci-discuss.net/hess-2017-549/hess-2017-549-RC1-supplement.pdf

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