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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Surface water monitoring in small water bodies: potential and limits of multi-sensor Landsat time series" *by* Andrew Ogilvie et al.

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Ogilvie et al. develop and present an important methodology which values available remote sensing informations and opens low cost applications in the future. It allows assessing and mapping filling of reservoirs spread across a semiarid area, with strong implications for monitoring resources availability across the territory where water is crucial in the Water-Food-Energy-Development nexus; as well as agregation of hydrological impacts on the functioning of the whole basin. The methodology is developed and tested thanks to accurate field campaigns, over a pilot basin in central semiarid Tunisia which is emerging as a strong reference since 15 years.

The methodology is based on the use of 7 well known spectral indices; and their assessment thanks to the available Landsat images is well justified and discussed, against field difficulties such as shallow waters, vegetation development, frequency of images regarding rapid dynamic of floods.

Litterature review about these 7 indices, and their previous applications and limits could be expanded in section 2.4 as it is too implicit so far. It is refered to a "widely used" status whereas it is mentioned at some places that these are more or less relevant (rural gently sloping watershed, design to detect mixed water reflectance, MNDWI outperformed AWEI when extracting narrow water bodies...).

Also a rapid positioning of this approach regarding spatial altimetry and geodesy applied to lakes would be welcome to better assess the challenges of small reservoirs in data scarce regions (See for instance Cretaux et al., 2011, 2015, 2016).

My major concern is the need to better explicit the hydrometric approach: remote sensing allows to assess water surface. Deducing water storage / volume / availability / resources needs the use of a volume-stage-surface / rating / bathymetric curve. This should be made more explicit in principle in the Introduction and then the Methods section. Further, the bathymetric curves of small reservoirs in this region are not stationnary, as erosion-silting is important, yet very heterogeneous across regions and so reservoirs. The Authors say page 19 that the curve of the biggest reservoir (Mora) is obsolescent because not updated over the past 20 years. This points the need to precisely address the issue of the exact availability and accuracy of bathymetric curves for every considered reservoirs (beyond the short statement on P5, L15 referring to old Albergel and Rejeb, 1997 reference); as well as consequences in terms of uncertainties in the overall method.

Minor issues: - P1, L22: Reservoirs do not reduce soil loss - but sediment transfer once in the network. - P2, L20: Okavango and Mekong Deltas. - P3, L33: Localise instead of localised. - Section 2.5: What are the exact dates of the images - and what

are the characteristics of the rainfalls over that particular period? - P9, L17: Provide references about Gouazine basin and reservoir (Nasri et al., for instance). - P13, L6: Duplication of "in". - P16, L2: The Merguellil catchment. - P33, L4: author Calvez duplicated.

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