

## ***Interactive comment on “Drivers of spatial and temporal variability of streamflow in the Incomati River Basin” by A. M. L. Saraiva Okello et al.***

**Anonymous Referee #1**

Received and published: 22 August 2014

Saraiva Okello et al., attempt to assess the drivers and implications of significant changes in streamflow dynamics for the period of 1970 to 2011 in the Incomati River Basin. While the topic is relevant and matches the scope of the journal of Hydrology and Earth System Sciences, they should address the following comments before the paper is published:

- (1) How was the rainfall data checked for consistency and patched? In their results section, the authors state: "... the trend identified could be affected by data infilling procedures."
- (2) Why are they using three different time periods (rainfall: 1950-2000 and 1950-2011; streamflow: 1970-2011)?

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(3) What do the authors qualify as “major abstractions”?

(4) Flow gauge X2H012 drains a very small portion of the upper Crocodile sub basin. It is therefore misleading to refer to a table that presents changes in land and water use for the entire Crocodile sub basin. The author should check orthophotos, etc, to understand the changes in land use of the area drained by X2H012.

(5) South Africa has a number of strategies on water demand management and water conservation. How can they be better implemented in the area in light of the results of this study? Be specific.

(6) The authors state that water demand management and water conservation should be alternative options to the development of dams. Are the countries planning to build more major dams? Is there a viable dam site? If not, the comment is at best irrelevant. If yes, does it make sense for the countries not to build that dam? This should not be brushed over. It requires a robust discussion.

(7) There is no mention of the proliferation of small farm dams in the basin. Do they have any impact on streamflows?

#### SPECIFIC COMMENTS

(1) Put the references in chronological order

(2) Page 8882, remove the last (the) of the last sentence.

(3) Page 8883,  $5.5 +33.2 +61.4 = 100.1\%$

(4) Page 8884, the Kruger National Park is part of the Greater Limpopo Transfrontier Park.

(5) Page 8885, section 2.2.1. The main custodians of the rainfall...

(6) Page 8885, section 2.2.1. Eight of the 20 time 15 series were extended up to 2012,...

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(7) Page 8887, section 2.2.3. ... in order to access (assess) impacts on streamflow caused by anthropogenic drivers

(8) Page 8887, section 2.2.3. ...was compiled for the various hydrological indicators and plotted spatially (mapped), using ArcGIS 9.3

(9) Page 8887, section 2.2.4. Provide the references of the NLC 2004 and 2011 you mention.

(10) Page 8887, section 2.2.4. (last sentence). ...by looking at (the) temporal evolution on (of) the land use change.

(11) Page 8890. This means that along (across) the entire basin...

(12) Page 8891. The annual flow duration curve for the periods 1949–1974 and 1978–2011 shows a dramatic decrease in annual flows. [[[Either show the graph or delete the sentence.]]]

(13) Page 8894, Section 4.1. [rephrase the last sentence]: An analysis of the best quality stations and a number of stations in the same system was conducted, to avoid this pitfall.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 8879, 2014.

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