Interactive comment on "Sediment concentration rating curves
for a monsoonal climate: upper Blue
Nile Basin" *by* M. A. Moges et al.

Anonymous Referee #1

Received and published: 1 February 2016

The manuscript is well-written and proposes an alternative method for determining sediment rating curves in monsoonal rivers. The authors rightly state that during the rainy season in the Blue Nile basin of Ethiopia, the sediment concentration for a given discharge decreases. They propose a linear transition from a transport limited system to a source limited system as the rainy season progresses. This method improves in particular the sediment concentration rating curves for four tributaries to lake Tana, and also gives good results on four small catchments for which the method was not calibrated. The methodology for determining the rating curves is clearly explained, and the parameters are obtained by fitting on a historic dataset.

My main concern is the PT parameter. I could not understand from the manuscript how this parameter was determined (page 1428, line 12). The PT is crucial for determining the stage within the rainy season and selecting the discharges to determine the end-members of the 'a' parameters. The approach is illustrated in Figure 1, but this does not indicate how the parameters are determined from the data.

Minor remarks: Page 1421, line 11: Please avoid abbreviations such as 'GERD' if you do not use them later on in the text.

Page 1422 Line 3-5. Is there a connection between the two approaches mentioned: models and rating curves? Please discuss in a couple of sentences which models use rating curves.

Page 1423 line 6-8: There are two arguments mixed up in this sentence: percentage of freshly plowed land and wetness and cohesiveness of the soil. The first is determined by the timing in the crop calendar, while the second depends on the cumulative rainfall. Please separate these two issues. Line 15 . . .increases.. Line 24 word missing . . ..and aims to test how. . ... Line 24 Is not a range of scales optimistic? There are only two size groups of catchments (100's km^2 and 100 ha). This is hardly 'a range of scales'.

Page 1424 Line 7 (see also page 1423 line 7) Please e consistent in the spelling 'plowed ' or 'ploughed' Line 19. Is Pe the cumulative effective rainfall or the daily effective rainfall? How is Pe determined (only explained on page 1427, line 26)? I can understand the threshold for the beginning of the rainy season, but have some difficulties with the end of the rainy season. Over which time period does the Pe has to 0 to reach the end of the rainy season?

Page 1427 line 9-12. Please rephrase the sentence. There is some confusion between the years selected and the installation period of the SWC measures.

Page 1430 line 1 . . ..occurs. . ... Line 14 Rephrase 'and in addition not very well' Line 16 Delete the second 'of' Sections 4.1.3 and 4.2. Please change the order of Figs. 5

and 6, as you refer to Fig. 6 first and Fig. 5 later.

Page 1431 line 21 and line 24 . . .concentrations. . .

Page 1432 line 2 Delete 'in the Ethiopian highlands' Line 12 'loads and discharge' Singular or plural, please be consistent. Line 21 Please give the parameter in brackets that describes 'the amount . . ..of the rainfall' Line 26 Please check the spelling of 'gauge' or 'gage' (used earlier in the text)

Page 1433 line 4 . . .watersheds. . .. Line 10 . . ..after land is plowed (or ploughed see earlier remark) and reills are formed. Line 16 . . .gentle slope. . .. Line 17. . .coefficient compared to the Maybar. . .. Line 20 ..the other four watershed.. Line 23 ..Gumara has the greatest value. . .. Line 24-25 Unclear sentence. Please break up: first mention human activities, and specify them in a separate sentence.

Page 1434 Line 2 . . ..sediment concentrations. . .. Line 2 . . .observation while developing. . .. Line 4 . . .improves the prediction of the sediment. . .. Line 10 Part of the sentence (and more importantly the clue of the paper) is missing after 'might have'