Supplementary file 2

The following words are added to explain Pettitt test in the end of P5493:

"Nonparametric Pettitt test is used in this study to detect a change point if a significant trend existed in the data series. The test is a kind of distribution-free method, and allows minimum assumptions to be made about the data. Therefore it is particularly suited to hydrological series. The test is robust, simple and relatively powerful (Kundzewicz and Robson, 2004). Pettitt test uses a version of the Mann-Whitney statistic, $U_{t,N}$, that verifies if two samples of $x_1,\ldots,x_t$ and $x_{t+1},\ldots X_N$ are from the same population. The test statistic, $U_{t,N}$, is given by

$$U_{t,N} = U_{t-1,N} + \sum_{j=1}^{N} \operatorname{sgn}(x_t - x_j) \quad \text{for } t = 2,\ldots N \qquad (6)$$

where *sgn* (θ) =1 if $\theta>0$; $sgn(\theta)=0$ if $\theta = 0$; $sgn(\theta) = -1$ if $\theta < 0$.

The test statistic counts the number of times a member of the first sample exceeds a member of the second sample. Its statistic *k(t)* and the associated probabilities used in the significance testing are:

$$k(t) = \max_{1\le t\le N} \left|U_{t,N}\right| \qquad (7)$$

and $$P \cong 2\exp\left\{-6(k_N)^2 / \left(N^3 + N^2\right)\right\} \qquad (8)$$

Additionally, sequential Mann-Kendall test is also used to validate the result of change point detected with Pettitt test in streamflow and sediment load. It is also helpful to compare the results of change point tested by the non-parametric methods with the original data series to determine the change point used in this study."