S1. Information about the image acquisition and processing.

A Nexus 7 (2013) tablet was installed above the Kinoshita flume. A surveillance application called IP Webcam was used to download the images from the tablet to the computer. The raw images from the tablet (Fig. S1.1.1) were downloaded every 10 seconds. All images were then processed in MatLab.

A mask, following the perimeter of the middle bend of the Kinoshita fume, which is the region of interest ROI for the study, was drawn once and then applied to all images in the series. The mask is a matrix that contains ones inside the ROI and zeros outside. To apply the mask, element by element multiplication is used. Therefore, after multiplying the mask by every image in the series, the resulting images are cropped and only the information inside the ROI remains (Fig. S1.1.2). The cropped images were converted to gray scale in MatLab using the 'rgb2gray' function (Fig. S1.1.3). Then, using the method of Otsu (1979), as implemented in MatLab ('graythresh' function), the images were binarized (Fig. S1.1.4).

Within the binary image, the exposed bedrock areas correspond to white pixels, and therefore have a value of 1, and the alluvium which is black has a value of zero. The total area of the bend corresponds to the total number of pixels inside the mask (N). The area of exposed bedrock corresponds to the sum of all pixels in every image. Since only the exposed bedrock areas contribute to the sum, the result corresponds to the exposed bedrock area. The percent of alluvial cover is calculated as shown in Eq. S1 below. The result is a temporal series of alluvial cover (Fig. S1.1.5).

$$p_{c_{ROI}} = \frac{\left(N - \sum_{i=1}^{N} px_i\right)}{N} \tag{S1}$$

1. Raw image
2. Masked (clipped) image
3. Gray scale image
4. Black and white image (based on threshold)
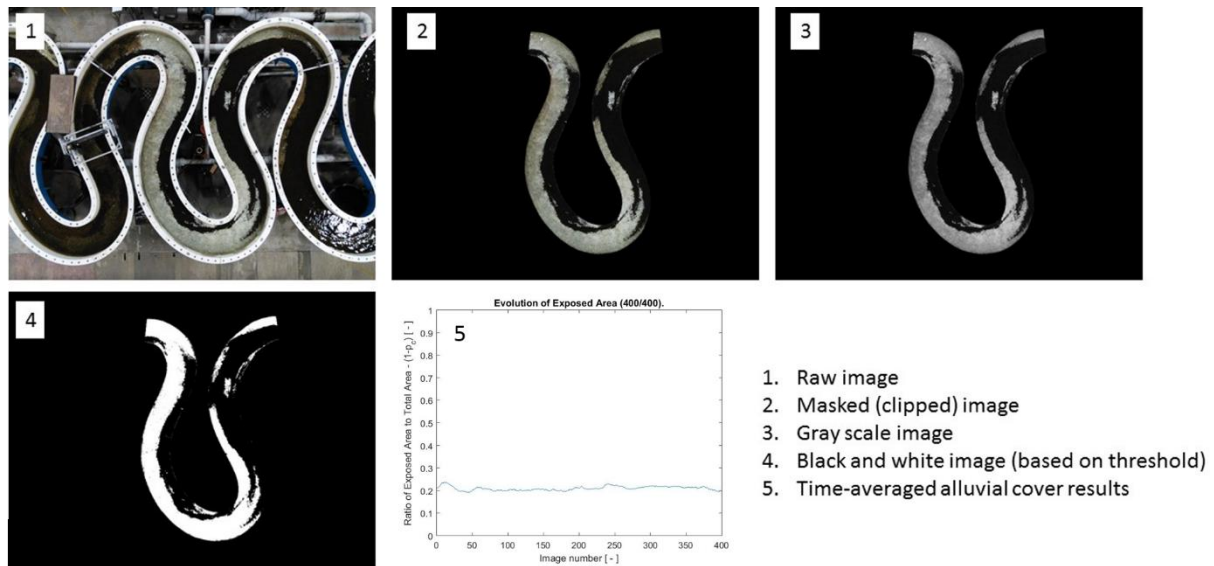5. Time-averaged alluvial cover results

Figure S1.1 Image processing steps for the calculations of alluvial cover in the middle bend of the Kinoshita flume.