Grain sizes analysis of pebbles along the North Platte River, USA
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Aims
The stratigraphic record could be used to decode the information on the tectonic and climatic conditions that happened at the time of deposition (Densmore, Allen, & Simpson, 2007; Whittaker, Attal, & Allen, 2010).
In the Great Plain, it is clear that huge incisions happened during late Miocene (about 6Ma) and Modern time (from 2.5M to today). And we all know that there has not been much subsidence of the Great Plains, tectonic activity has been minor and only a thin layer of sediment has been deposited to the east of the study area in the past 5–10 Ma (Diffendal, 1982; McMillan et al., 2002; Swinehart, Souders, Degraw, & Diffendal, 1985). It can be inferred that recycling would play an important role on the income of sediment grains. Grain sizes analysis of pebbles along the North Platte River might provide more information about this recycling process.

Methodology
To gain an accurate grain size trends in Modern stratigraphy, Grain size distributions were collected along the North Platte River in 14 sites. All the sites are well exposed modern bar. Scaled photo were taken to estimate grain size (Bunte & Abt, 2001). When counting the grain sizes, a grid was imposed onto the digital image and the visible major and minor diameters of clasts lying on each of 100 grid intersection points were measured. The smallest clasts that could be accurately measured from such photographs were about 2mm in diameter (Whittaker et al., 2011). For each site, the median grain size value, D_{50} and the 84th percentile, D_{84} of the deposits are estimated. Multiple counting were undertaken to reduce the error in our estimates of D_{50} and D_{84}.
For the data of the Great Plain, we did similarity analysis by plotting the similarity variable ξ against the frequency density of a grain size distribution for all the sample-sites along the North Platte River.

Main Findings

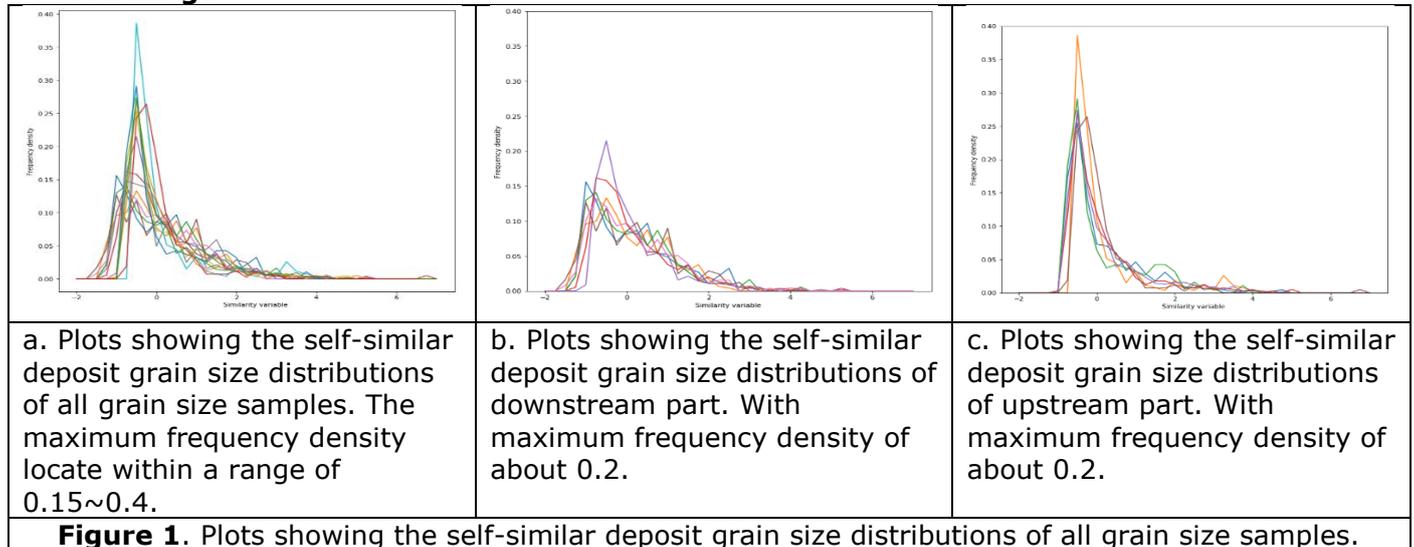| a. Plots showing the self-similar deposit grain size distributions of all grain size samples. The maximum frequency density locate within a range of 0.15~0.4.	b. Plots showing the self-similar deposit grain size distributions of downstream part. With maximum frequency density of about 0.2.	c. Plots showing the self-similar deposit grain size distributions of upstream part. With maximum frequency density of about 0.2.

Figure 1. Plots showing the self-similar deposit grain size distributions of all grain size samples.

It is obvious to see an internal differentiation (Figure 1. a.) within these curves, with a dispersed range of 0.15~0.4 for frequency density. It can be easily divided into two groups (Figure1.b. & c.).
These two groups are located within two different parts of study area. The higher group is located within the mountain area and the lower group is located within the plain area. The self–similarity analysis is used to tell if the sediments were from the same channel system, so based on the self-similarity analysis of grain sizes data collected from the North Platte River, it is clear that the grain sizes distribution experienced a huge change in the plain area with the mix of new sediments. This abnormal downstream grain sizes change provides potential evidence for the existence of recycling in the plain area.

Value of the BSG grant
Cover the flight tickets, in pump priming other funding.