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River rapid hydraulics in the Grand Canyon

Seeing and feeling the power of the river rapids as one [goes down the Colorado River in the Grand Canyon](#) is a great pleasure. It also affords the opportunity to learn a bit about how rivers work and the very most basic ideas of hydraulics.

I use the rapids and some very cool maps and papers by Sue Kieffer (see below) in my Geomorphology course. The power point of the lecture is here (look at the second half): <http://arrowsmith362.asu.edu/Lectures/Lecture17/> and here (also second half): <http://arrowsmith362.asu.edu/Lectures/Lecture18/>.

One of the exercises I like to do is have videos of us going through the rapids as the source of information for path and timing which is mapped onto the Kieffer hydraulic map of the rapids. Here are some lecture notes: [notes](#).

Here are two new videos:

[Hermit Rapid](#)

[Lava Falls Rapid](#)

I have various Grand Canyon pictures at these two links:

http://activetectonics.la.asu.edu/ramon/Images/Grand_Canyon and

<http://picasaweb.google.com/jrarrowsmith/GrandCanyonPewePowell2008>.

Kieffer References:

Kieffer, S. W., 1988, Hydraulic maps of major rapids, Grand Canyon, Arizona. U. S. Geological Survey Miscellaneous Investigations Map Series I-1897 A-J.

Kieffer, S. W., J. B. Graf, and J. C. Schmidt, 1989, Hydraulics and sediment transport of the Colorado River. In: Elston, D. P., G. H. Billingsley, and R. A. Young, eds. Geology of the Grand Canyon, Northern Arizona (with Colorado River Guides), Field Trip Guidebook T115/315 for the 28th international Geological Congress, 239 pp.

Kieffer, S. W., 1985, The 1983 hydraulic jump in Crystal Rapid: implications for River-running and geomorphic evolution in the Grand Canyon. *Journal of Geology*, v. 93, pp. 385-406.

Kieffer, S. W., 1990, Hydraulics and geomorphology of the Colorado River in the Grand Canyon. In: S. S. Beus and M. Morales, eds., *Grand Canyon Geology*, New York: Oxford University Press, p. 333-384.

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