Preliminary Analysis Of Sediment Transport Capacity In The Colorado Plateau

Robert T. Milhous

Abstract: Previous investigators (Hereford et al, 2002) have postulated there have been three climate regimes in the Colorado Plateau during the 20th Century: 1905-1941, 1942-1977, and 1978-1998. Changes in the ability of four rivers in the Colorado Plateau (USA) to transport sediment were investigated using the time series of an index (STCI) of the ability of the river to transport sediment. The four rivers are the Rio Puerco near Bernardo, NM; Paria River at Lees Ferry, AZ; Sevier River at Hatch, UT; and the Little Colorado at Woodruff, AZ. The index is calibrated to measured sediment concentrations. The Sediment Transport Capacity Index (STCI) time series graphs suggest there was a change in the climate about 1941 and there is a high probability a change in the climate also occurred in 1923. The situation for the postulated change in 1977 is not clear. There does appear to be changes between the dry 1942-1977 period and the wet 1978-1998 period but these are not the same in each of the four rivers. The STCI time series for the Sevier River had the expected pattern because the STCI increased nearly to the pre-1942 values from lower 1942-1977 values. The average STCI for the Little Colorado River increased but not nearly as much as suggested by the change in precipitation. The STCI for the Paria River essentially did not change. The real difference between expected change based on the change in precipitation, and the changes in the other three rivers, is the change in the time series of STCI for the Rio Puerco. The STCI of the Rio Puerco decreased significantly between the 1942-1997 period and the 1978-1998 period.