3.3 Double mass curve

Double mass curve is a simple, visual and practical method, and it is widely used in the study of the consistency and long-term trend test of hydrometeo--rological data (Mu, et al., 2010). This method was first used to analyze the consistency of precipitation data in Susquehanna watershed United States by Merriam at 1937 (Merriam, 1937), and Searcy made a theoretical explanation of it (Searcy, et al., 1960). The theory of the double-mass curve is based on the fact that a plot of the two cumulative quantities during the same period exhibits a straight line so long as the proportionality between the two remains unchanged, and the slope of the line represents the proportionality. This method can smooth a time series and suppress random elements in the series, and thus show the main trends of the time series. In recent 30 years, Chinese scholars analyzed the effect of soil and water conservation measures and land use/ cover changes on runoff and sediment using double mass curve method, and have achieved good results (Mu, et al., 2010). In this study, double-mass curves of precipitation vs streamflow and precipitation vs sediment are plotted for the two contrastive periods to estimate changes in regression slope (proportionality) to quantify the overall efficiency of soil conservation measures before and after transition years.