



Baseflow recession analysis across the Eagle Ford shale play (Texas, USA)

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Baseflow is an important process of the hydrological cycle as it can be related to aquatic ecosystem health and groundwater recharge. The temporal and spatial dynamics of baseflow are typically governed by fluctuations in the water table of shallow aquifers hence groundwater pumping and return flow can greatly modify baseflow patterns. More recently, in some regions of the world the exploitation of gas trapped in shale formations by means of hydraulic fracturing (fracking) has raised major concerns on the quantitative and qualitative groundwater impacts. Although fracking implies massive amounts of groundwater withdrawals, its contribution on baseflow decline has not yet been fully investigated. Furthermore, its impact with respect to other human activities or climate extremes such as irrigation or extreme droughts, respectively, remain largely unknown.

This work analyzes baseflow recession time-space patterns for a set of watersheds located across the largest shale producer in the world, the Eagle Ford shale play in Texas (USA). The period of study (1985-2014) includes a pre-development and post-development period. The dataset includes 56 hydrometric time series located inside and outside the shale play.

Results show that during the development and expansion of the Eagle Ford play, around 70 % of the time series displayed a significant decline whereas no decline was observed during the pre-development)