Asymptotics of partial sums of linear processes with changing memory parameter

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We study limit distribution of partial sums of nonstationary linear processes $X_1, \dots, X_n$ with long memory and changing memory parameter $d_{t,n} \in (0, 1/2)$. The cases of fast changing ($d_{t,n} = d_t$ does not depend on n) and slowly changing memory ($d_{t,n} = d(t/n)$ for some function $d(\tau), \tau \in [0, 1]$) parameters are separately discussed. In the case of fast changing memory, the limit of partial sums for the linear processes under consideration is a fractional Brownian motion with the Hurst parameter determined by some aggregation rule from $\{d_t\}$. In the case of slowly changing memory, the limit of partial sums is degenerated and 'localized' at the global maximum of the memory function $d(\cdot)$; however, a nondegenerate limit of the partial sums process is shown to exist when time is rescaled at the vicinity of the maximum point.