Monitoring the intraday volatility pattern
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Abstract. A functional time series consists of curves, typically one curve per day. The most important parameter of such a series is the mean curve. We propose two methods of detecting a change in the mean function of a functional time series. The change is detected on line, as new functional observations arrive. The general methodology is motivated by and applied to the detection of a change in the average intraday volatility pattern. The methodology is asymptotically justified by applying a new notion of weak dependence for functional time series. It is calibrated and validated by simulations based on real intraday volatility curves. We focus on the volatility of one minute returns on US stocks and indexes, but the statistical methodology we develop is very general, and can be applied to other asset classes, and to volume as well as volatility. In fact, it can be applied to any functional time series with a very general linear or nonlinear dependence structure, but we concentrate on detecting a change in the intraday volatility pattern.