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Temporal statistics of a meandering rivulet[1] PETER VOROBIEFF, The University of New Mexico, KEITH MERTENS, The University of North Carolina, Chapel Hill, VAKHTANG PUTKARADZE, Colorado State University — Meandering of a rivulet on an inclined, partially wetting surface can be triggered or suppressed by introducing small flow-rate fluctuations or, correspondingly, by reverting to a constant flow rate. Here we study a rivulet continuously meandering with flow-rate fluctuations present. Image sequences of the plane of the meander reveal a spatially and temporally resolved picture of the process, covering spatial scales from millimeters to meters and time scales from seconds to hours. For a given coordinate in the direction downstream from the origin of the rivulet, we construct time histories of the location of the rivulet centerline. Statistics of these time histories show an interesting correspondence with the spatial meandering statistics known from earlier work (such as the absence of a dominant wavelength), while also possibly manifesting previously unobserved trends at short time scales. It is also noteworthy that even a modest volume fraction of solid particles in the flow can radically alter the behavior of the rivulet, producing a stationary (pinned) meandering pattern.

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