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**Animikh Biswas, Zachary Bradshaw and Michael Jolly\*** (msjolly@indiana.edu),  
Department of Mathematics, Indiana University, Bloomington, IN 47405. *Data assimilation using  
local observables.*

We develop, analyze, and test an approximate, it global data assimilation/synchronization algorithm based on purely it local observations for the two-dimensional Navier-Stokes equations on the torus. We prove that, for any error threshold, if the reference flow is analytic with sufficiently large analyticity radius, then it can be recovered within that threshold. Numerical computations are included to demonstrate the effectiveness of this approach, as well as variants with data on moving subdomains. In particular, we demonstrate numerically that machine precision synchronization is achieved for it mobile data collected from a small fraction of the domain. (Received August 26, 2020)