**Description of Additional Supplementary Files** 

File name: Supplementary Movie 1

**Description:** Temporal evolution of the fMRI BOLD data during wakefulness and sleep

embedded in lower dimensional spaces for one subject. The video shows the intrinsic three-

dimensional manifold of subject 7, with color coding for both (A) sleep stage and (B) time-

index. fMRI BOLD data shows smooth intra-stage transitions and inter-stage shortcuts. The

frame rate is 10 times faster.