V5. Dynamic imaging of coherent sources in continues spikes and waves during slow sleep.—Natia Japaridze [a], Muthuraman Muthuraman [b], Dierk Carina [a], Anwar Abdul Rauf [b,d], Deuschl Günther [b], Stephani Urlich [a,c], Siniatchkin Michael [a] ([a] Department of Neuropediatrics, Christian-Albrechts-University, Kiel, Germany, [b] Department of Neurology, Christian-Albrechts-University, Kiel, Germany, [c] Northern German Epilepsy Centre for Children & Adolescents, Schwentinental/OT Raisdorf, Germany, [d] Digital Signal Processing and System Theory, CAU, Kiel, Germany)

The network of sources involved in the frequency oscillations of continuous spikes and waves during slow wave sleep and their causal architecture is still lacking in the current literature. In a couple of studies the network and causal connectivity was studied using fMRI by concentrating the analysis on the spikes and not on the background oscillations. In a number of studies the connectivity and the network of sources were studied during normal subjects sleep using fMRI. However, the earlier estimations do not directly relate to the background oscillations present during the interictal epileptiform patterns during sleep. In contrast the dynamic source coherence method is a tool to study the causality on the cortical and sub-cortical source level. In this study we measured the functional and directed connectivity with renormalized partial directed coherence during continuous spikes and waves during slow wave sleep EEG recordings from 12 patients. The network of sources involved was premotor cortex, posterior cingulate cortex, dorsolateral prefrontal cortex, middle temporal gyrus, medial thalamus and cerebellum. The cerebellum, thalamus and the posterior cingulate cortex showed significant bi-directional causality whereas all the other the sources showed uni-directional causality. Our results suggest that the mean source coherence could be an early biomarker for onset and severity of the disease. In addition we show the source network and the directed connectivity of the background frequency oscillations for continuous spikes and waves during slow wave sleep.

Natia Japaridze and Muthuraman Muthuraman contributed equally to this paper.