Ictal offset patterns and postictal dynamics-a SEEG study

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Materials and methods

Patient lot

Nr	Sex	Age	Lateralization	Nr of Electrodes	Pathology	Localization
1	F	17	L	11	Type IIb cortical dysplasia	Premotor dorsolateral
2	M	39	L	16	Polymicrogiria	Occipito-temporal basal
3	M	47	L	11	DNET	Temporal, middle temporal gyrus
4	F	40	L	11	Type IIb cortical dysplasia	Prefrontal
5	F	35	R	12	Hippocampal sclerosis	Temporo mesial
6	F	24	R	15	Type II cortical dysplasia	Rolandic
7	M	24	R	14	Type I cortical dysplasia	Occipito-temporal basal
8	F	25	R	10	Hippocampal sclerosis	Temporo mesial
9	F	46	R	9	Type I cortical dysplasia	Temporal pole
10	M	33	L	17	not operated on	Mesial Prefrontal
11	F	11	R	16	Type I cortical dysplasia	Superior frontal gyrus
12	F	35	R	14	DNET	Parietal Operculum+Insula
13	F	9	R	13	Type I cortical dysplasia	
14	M	28	R	15		Temporal
15	M	46	L	12	Hippocampal sclerosis	Temporo mesial

45 seizures (35 F, 5 F-induces, 5-SG), 2500 contacts, 4kHz sampling rate
230 contact-recording hours

The SEEG method-definition of concepts

SOZ: first path. activity (usually LVFA+DC) before CO, <structurally coherent>

EZ: primaryorganisation of the ictal network;

IZ: abnormal interictal activity;

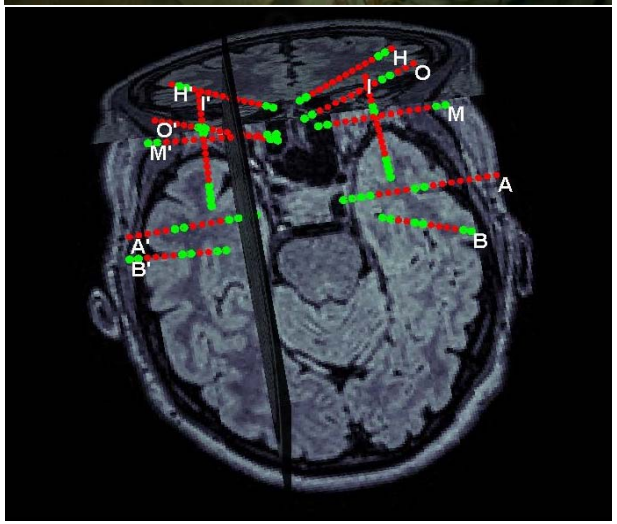
Rule: IZ⊆EZ ⊆SOZ

Ictal start: beginning of SOZ

Ictal end: end of repetitive/sharp activity or return to baseline

Pre-ictal period: Start - Ictal Period (-Stimulation Rhythm)

Post-ictal period: Stop + Ictal Period



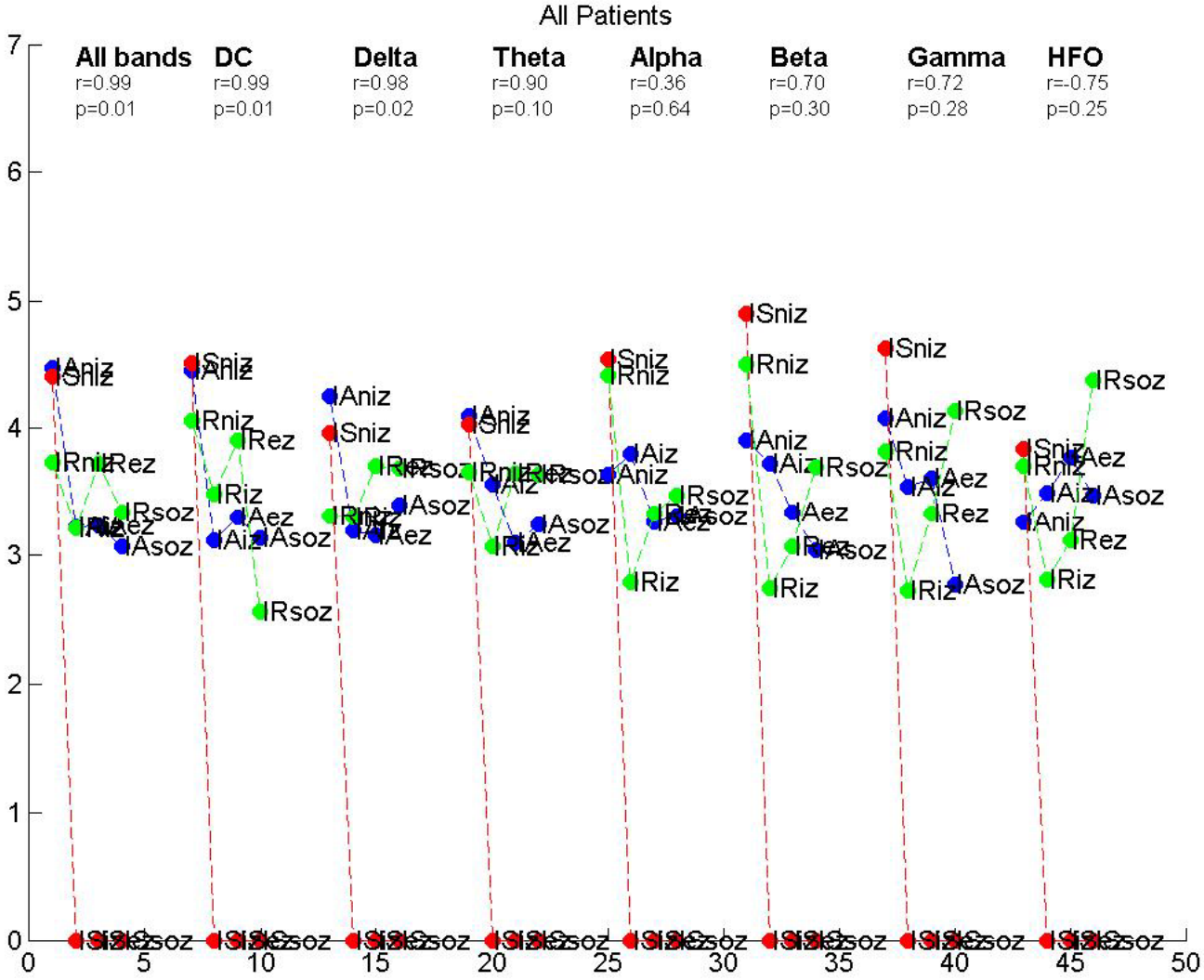
Introduced variables

- IA(Ictal Activation)=Ictal Energy/PreIctalEnergy;
- IR(Ictal Rebound)=PostIctal Energy/Ictal Energy;
- IS (Ictal Supression)=Postictal Energy/ PreIctal Energy;

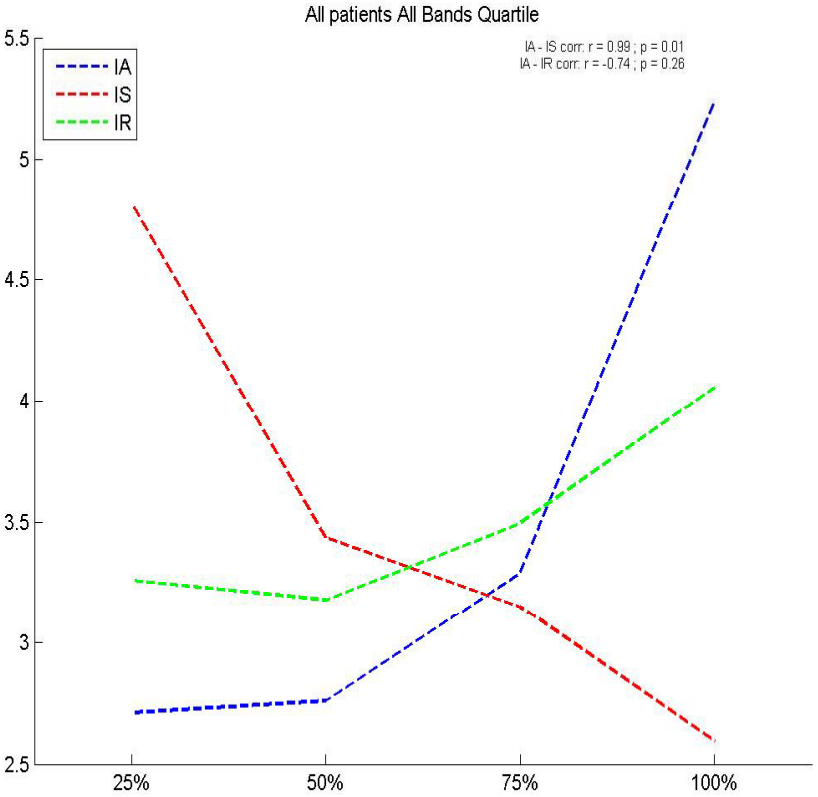
- Relative Ictal Activation= $\text{Ictal energy}_{\text{contact x}} / \sum_1^n \text{Ictal energy}_{\text{contact i}}$

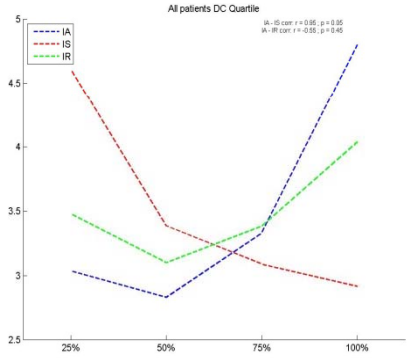
- Start/stop order= $t_x - t_{min} / t_{max} - t_{min}$

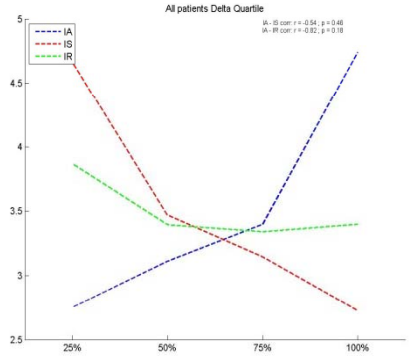
Energy dynamics-by epileptogenicity

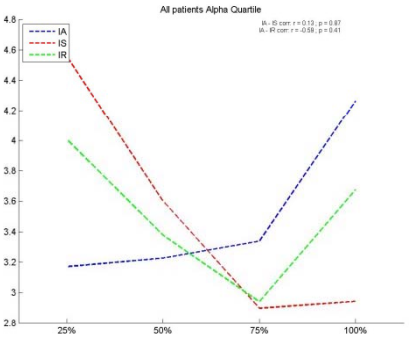


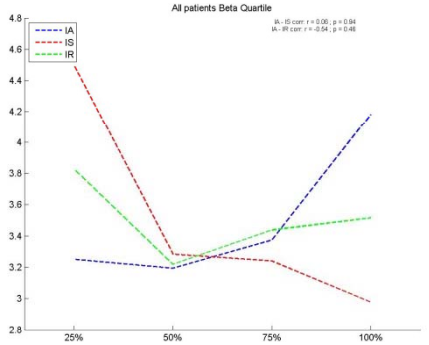
Energy dynamics-by ictal activation quartiles

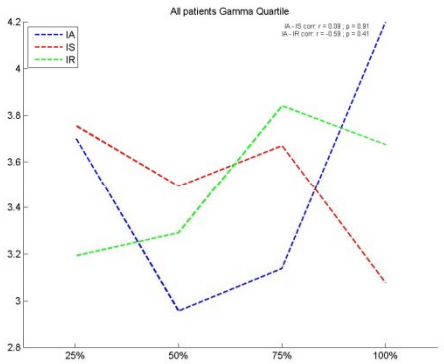


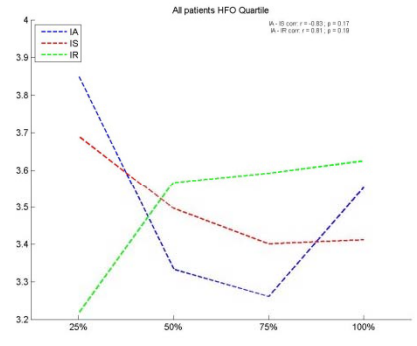




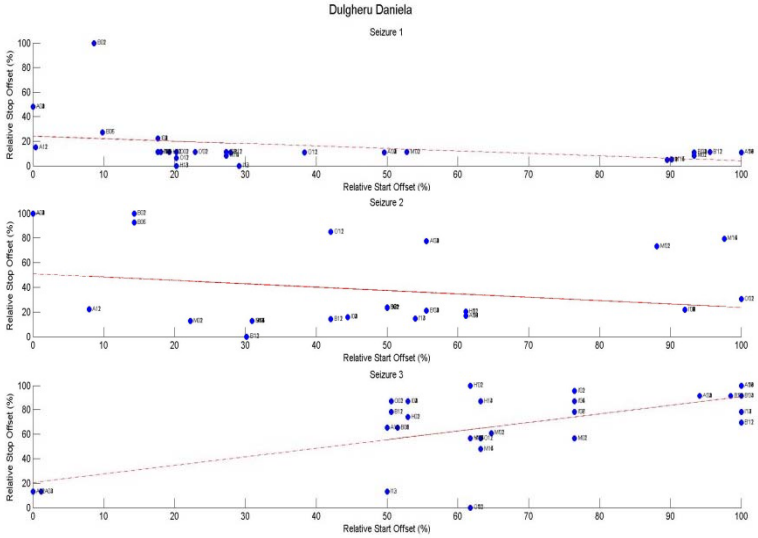


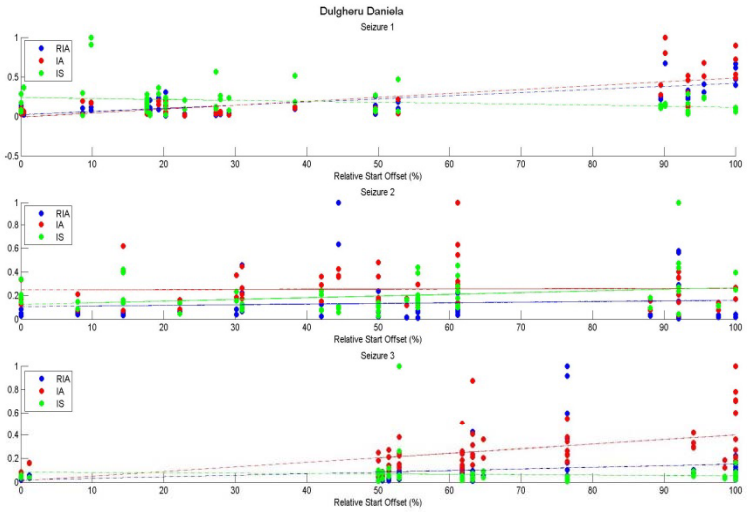


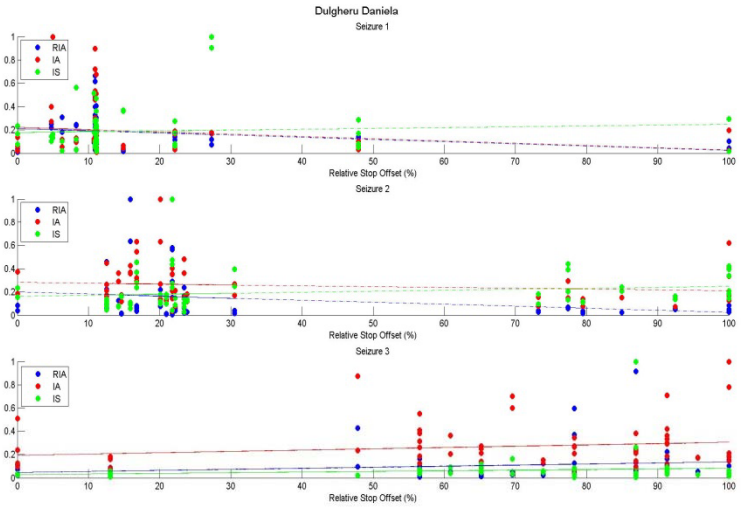




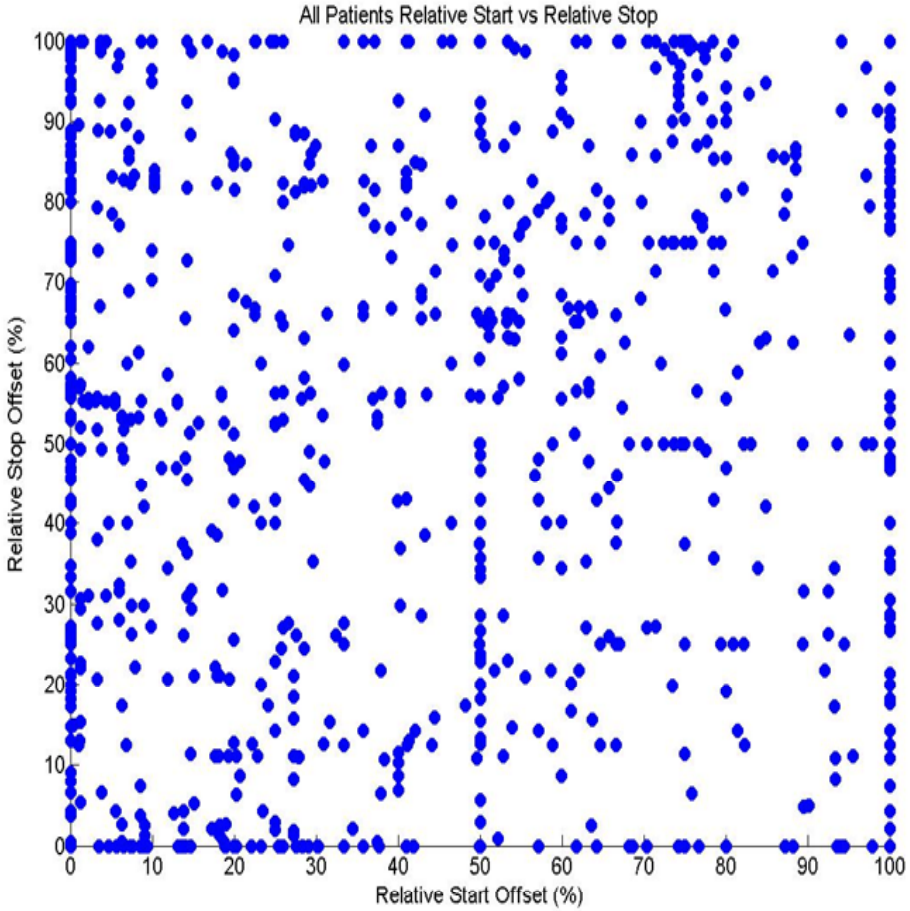
Ending chronology-single case example

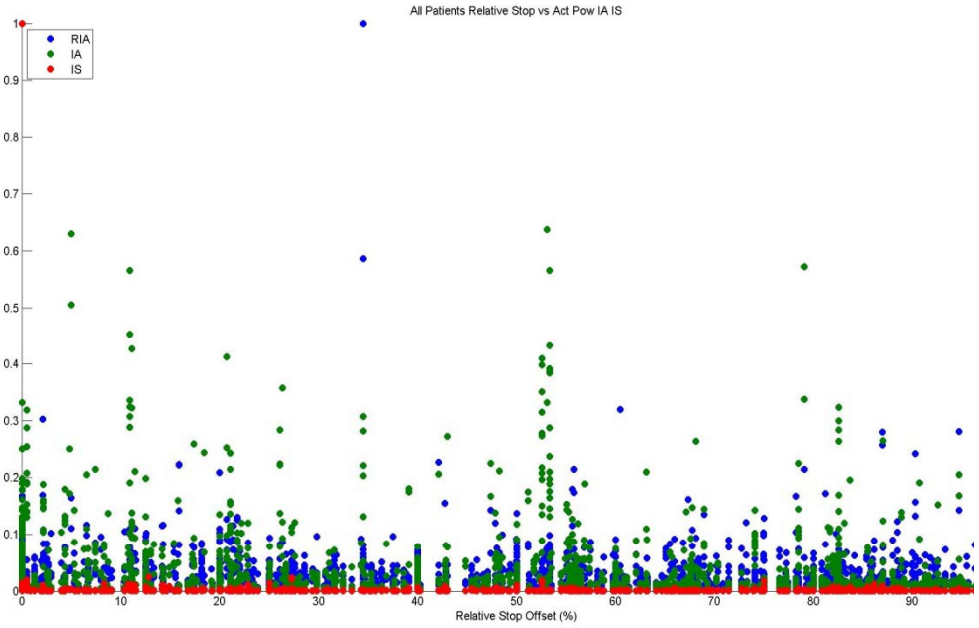




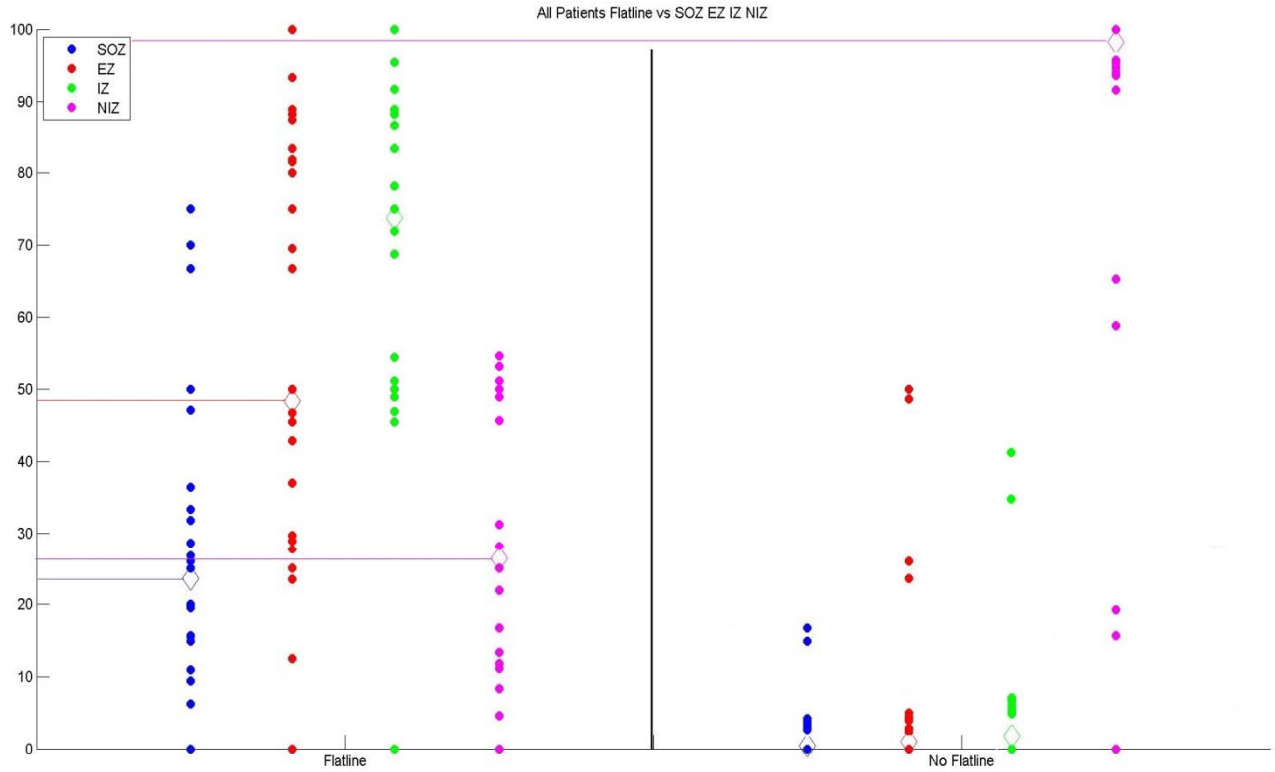


Ending chronology- whole lot



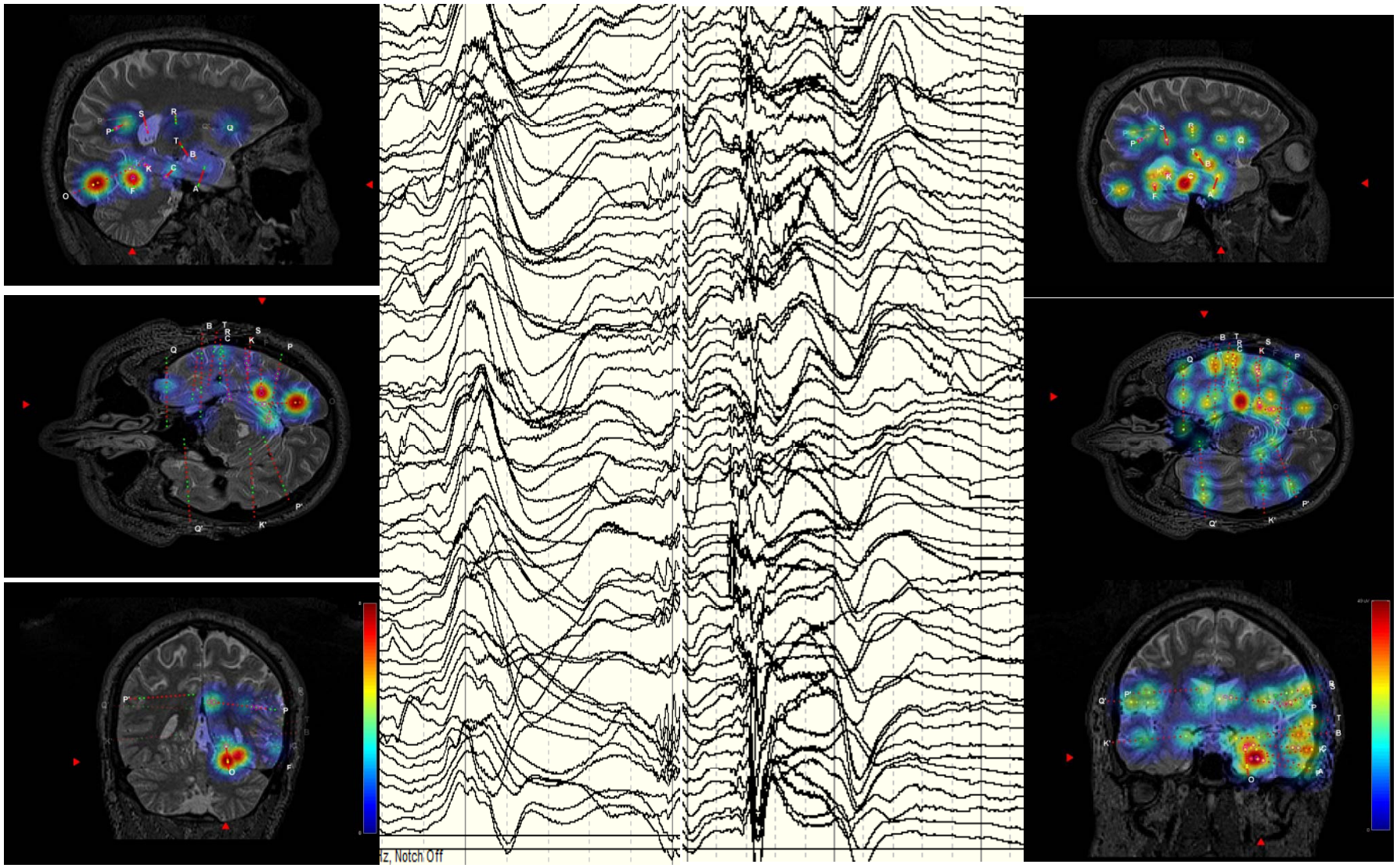


Postictal flatline



- SOZ Sensitivity: 42.34 Specificity: 99.08 Accuracy: 98.70 PPV: 0.23 NPV: 1.00
- IZ Sensitivity: 33.11 Specificity: 99.68 Accuracy: 97.90 **PPV: 0.74** NPV: 0.98
- Non IZ Sensitivity: 0.32 Specificity: 66.89 Accuracy: 2.10 PPV: 0.26 NPV: 0.02

Postictal HFOs

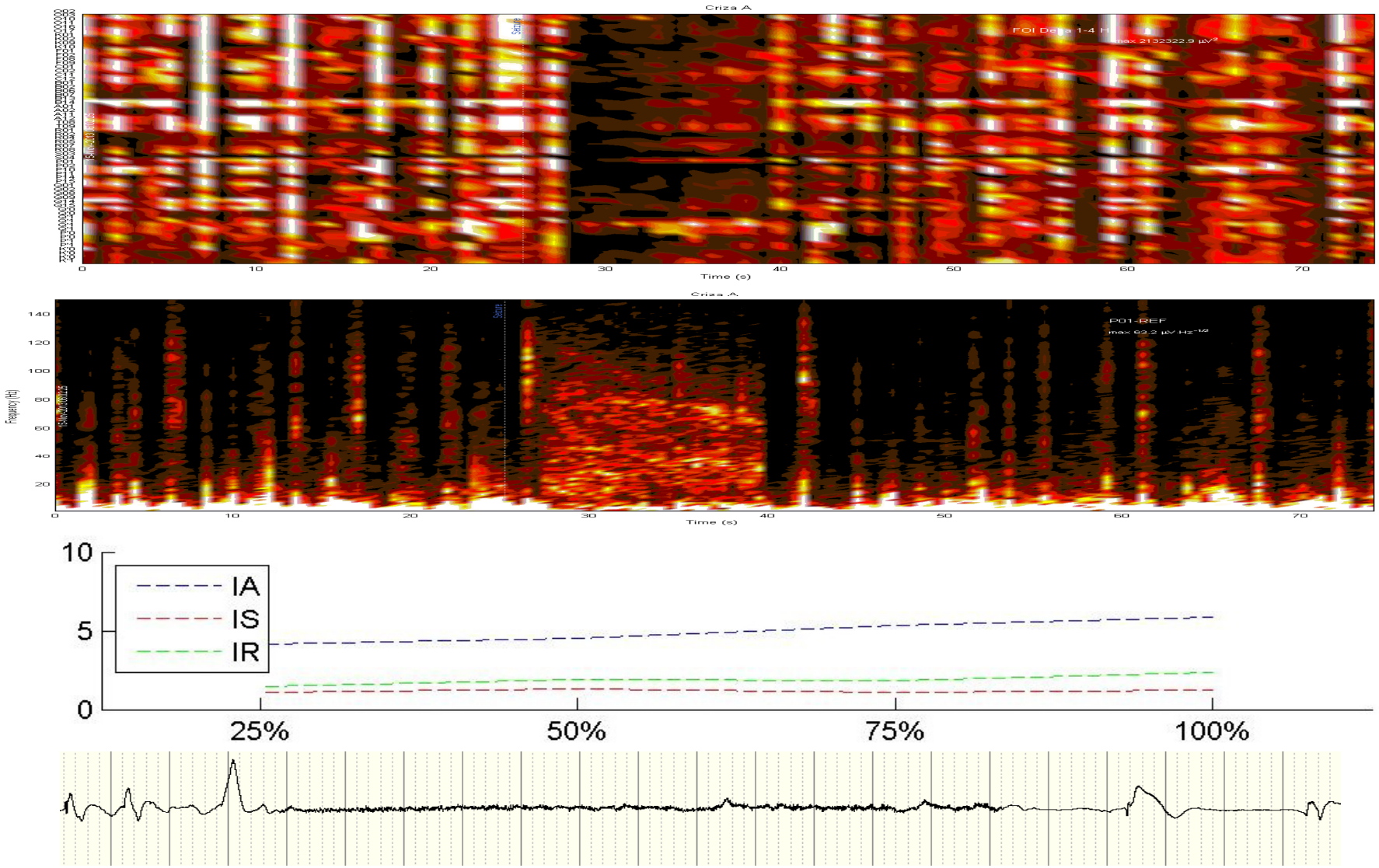


START **STOP**

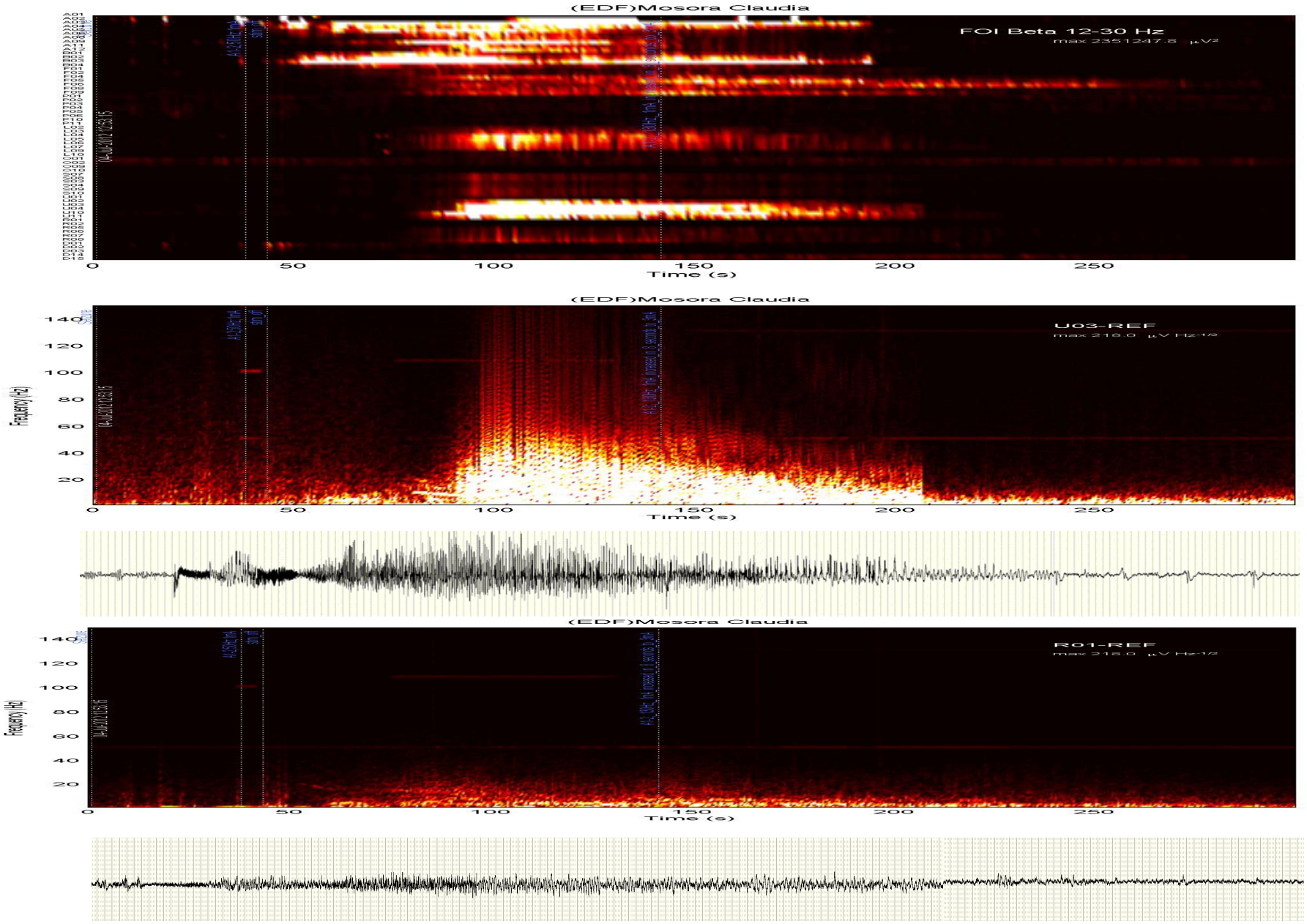
Postictal HFOs

- Sv= Sc= PPV= NPV=

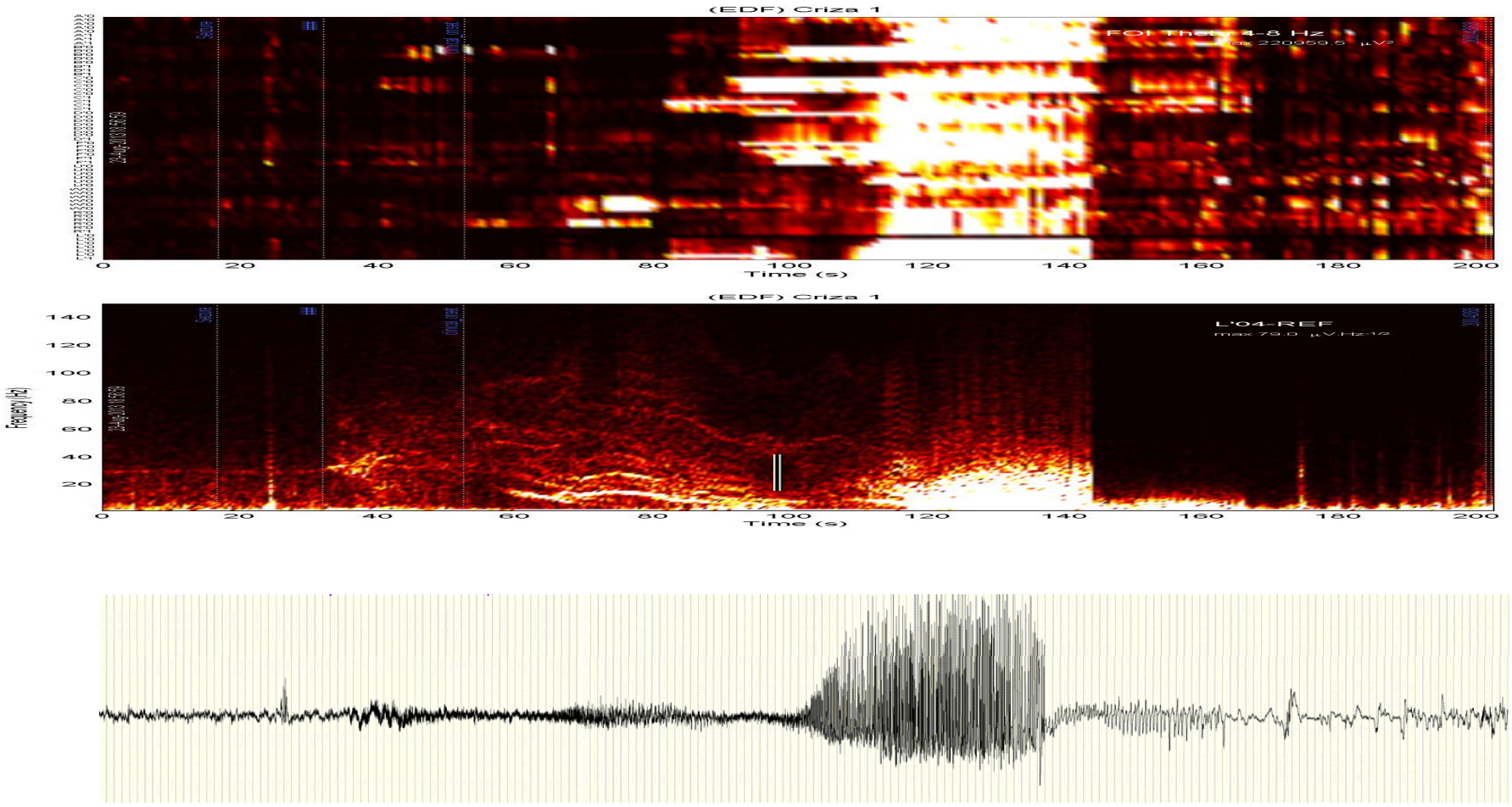
Ending patterns 1-focal hypersyncronous



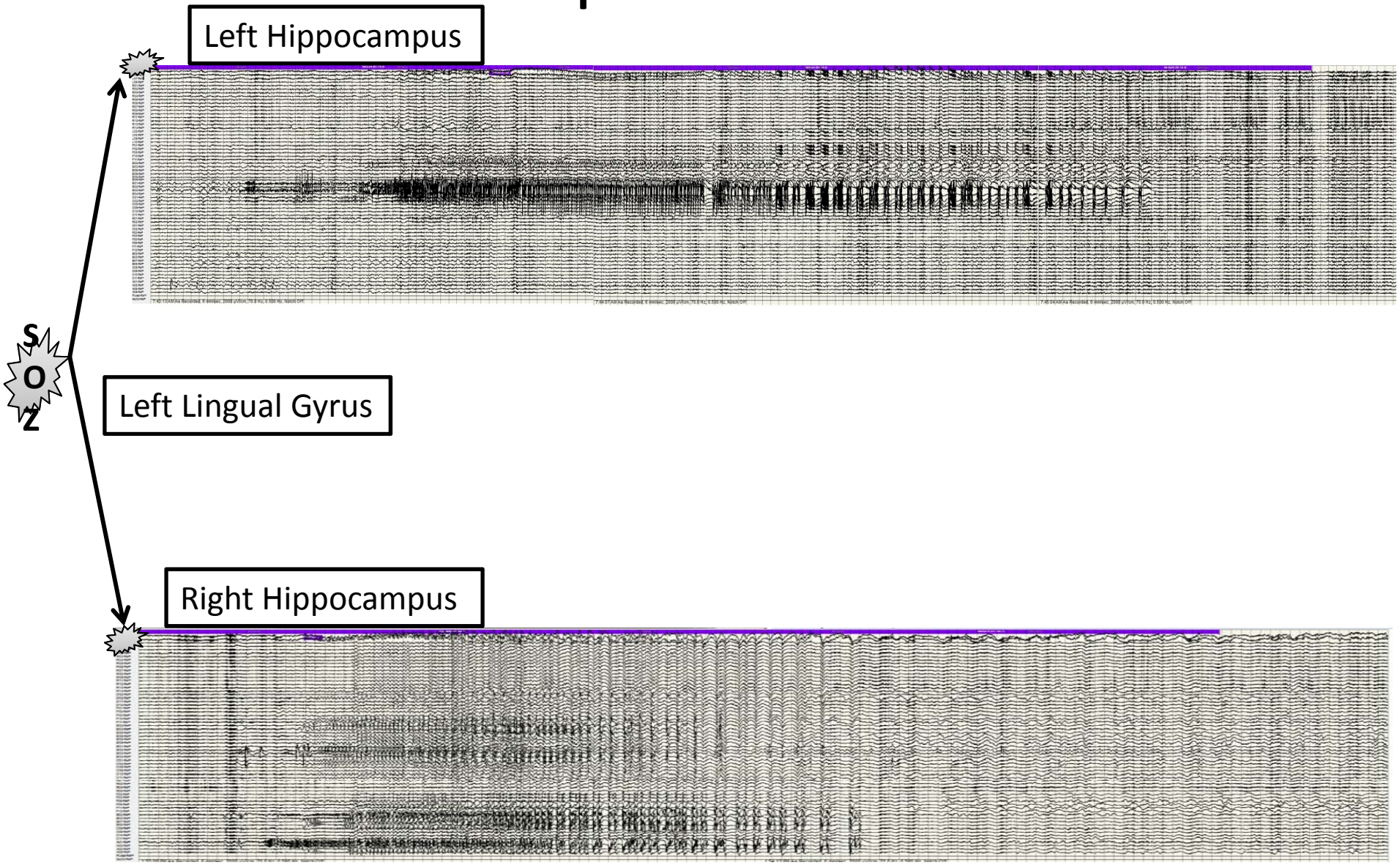
Ending patterns 2-focal asyncronous



Ending patterns 3-secondary generalised



Case presentation



Thank you for your attention