

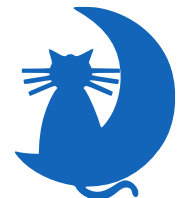
04/10/2025

MEDATEC
MEDICAL DATA TECHNOLOGY



SleepOnline 2025

Implementation in Medatec software



Agenda



1

About

2min

2

Follow-up

Kateline Driessens

- Hypoxic Burden Index (HBI)
- Pulse Wave Amplitude Drop (PWAD)

5min

3

Follow-up

Tom van Rijn

- Center of gravity
- Alpha-Delta Sleep
- Heart Rate Variability (HRV)

5min

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About Medatec

- Figures
- Activities
- Development Team



Kateline Driessens

About: Medatec



17+ people



36yo

About: Activities



Sleep



EEG



Evoked Potential



About: Development Team



Kateline Driessens



Stephane Adams



Tom van Rijn



Pierre Woiemberghe



Raphael Medaer



Vincent Lagarrigue

2

Follow-up

- Hypoxic Burden Index (HBI)
- Pulse Wave Amplitude Drop (PWAD)



Kateline Driessens

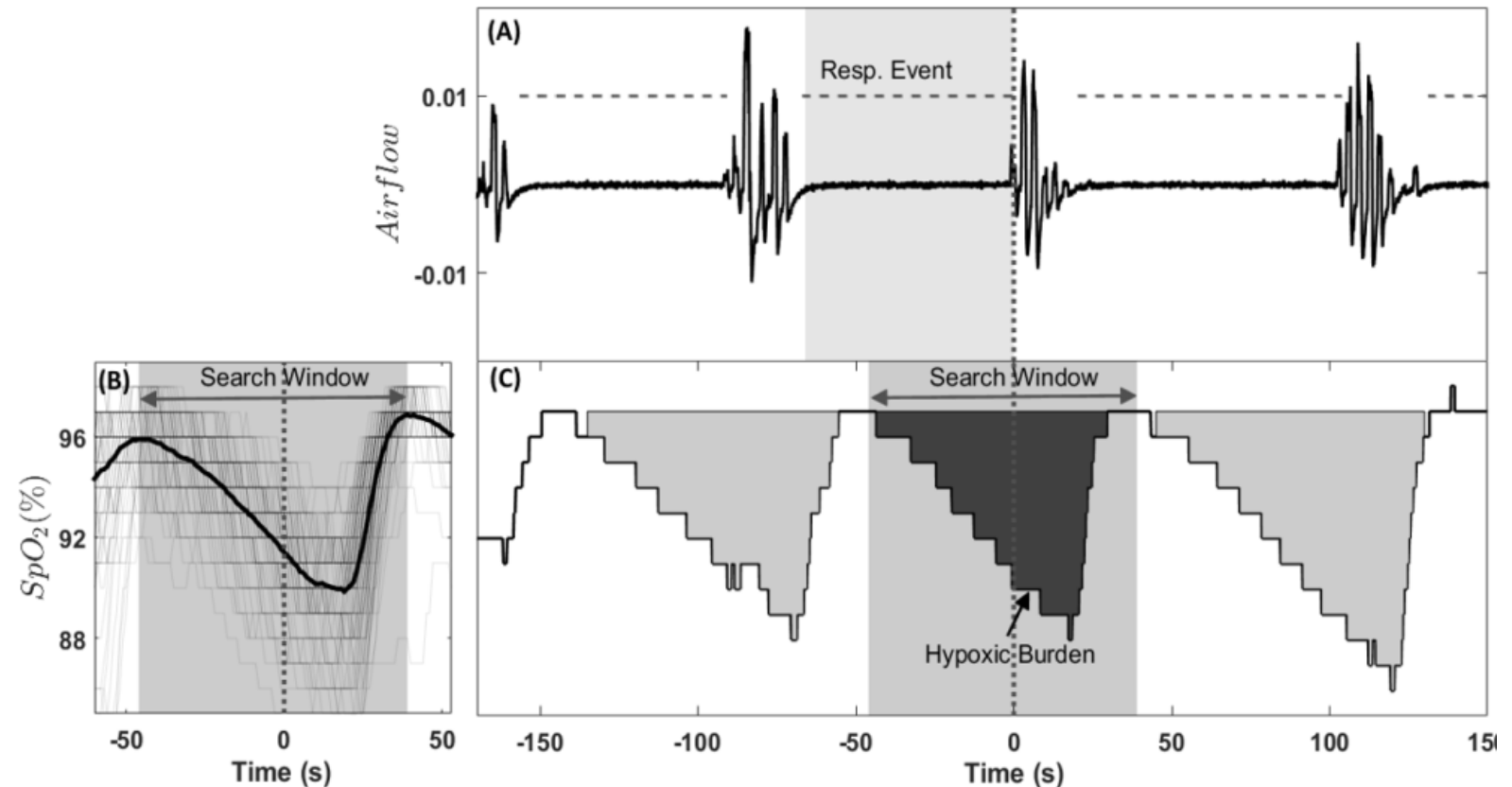
Hypoxic Burden Index explained



$$HBI = \frac{\sum_{i=1}^N AUC(\Delta SpO_2^{(i)})}{TST}$$

...

- **N:**
number of oxygen desaturation events during sleep
- **AUC($\Delta SpO_2^{(i)}$):**
the area under the curve (integral) of the desaturation event i , measured as %·seconds
- **TST:**
total sleep time
- **Search Window:**
Mean of desaturation calculated on all events with as trigger the end of the event



The hypoxic burden of sleep apnoea predicts cardiovascular disease-related mortality: the Osteoporotic Fractures in Men Study and the Sleep Heart Health Study

Ali Azarbarzin¹*, Scott A. Sands¹, Katie L. Stone^{2,3}, Luigi Taranto-Montemurro¹, Ludovico Messineo¹, Philip I. Terrill⁴, Sonia Ancoli-Israel^{5,6}, Kristine Ensrud⁷, Shaun Purcell^{1,8}, David P. White¹, Susan Redline¹, and Andrew Wellman

Sleep apnea-specific hypoxic burden, symptom subtypes, and risk of cardiovascular events and all-cause mortality
Trzepizur W, Blanchard M, Ganem T, Balusson F, Feuilloy M, Girault JM, Meslier N, et al

Hypoxic Burden Index codes



Hypoxic Burden Index (HBI) – Charge de désaturation

2551	HBI en sommeil	%.minutes/heure de sommeil
2552	HBI en REM	%.minutes/heure en REM
2553	HBI en Non-REM	Stades 1+2+SWS

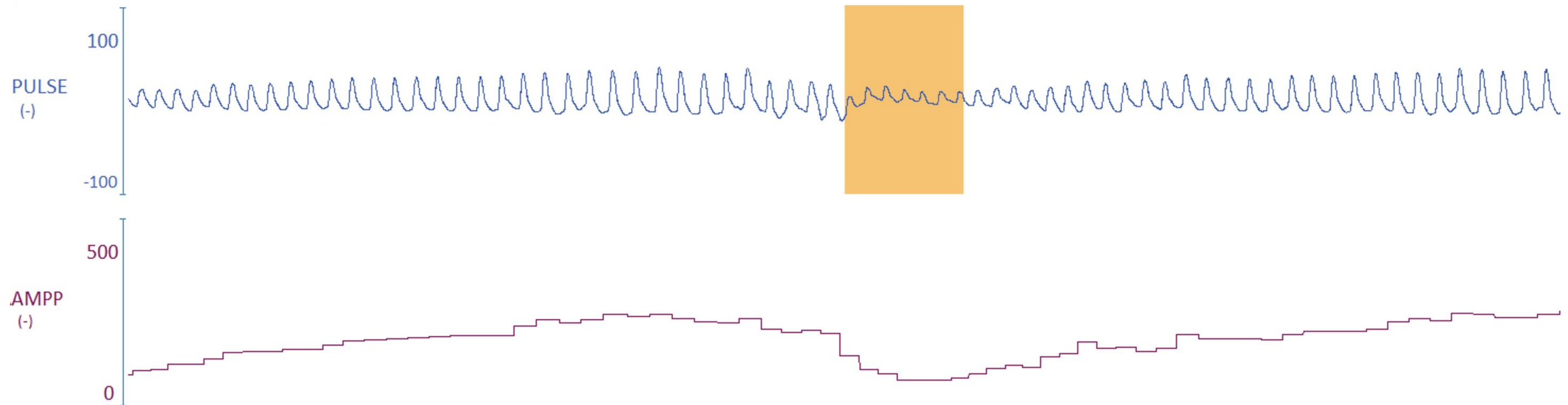
3

codes

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PWAD explained



Temporary reduction in pulse amplitude



Highlighted area shows the drop
(configurable)



Seen as a dip in the AMPP curve

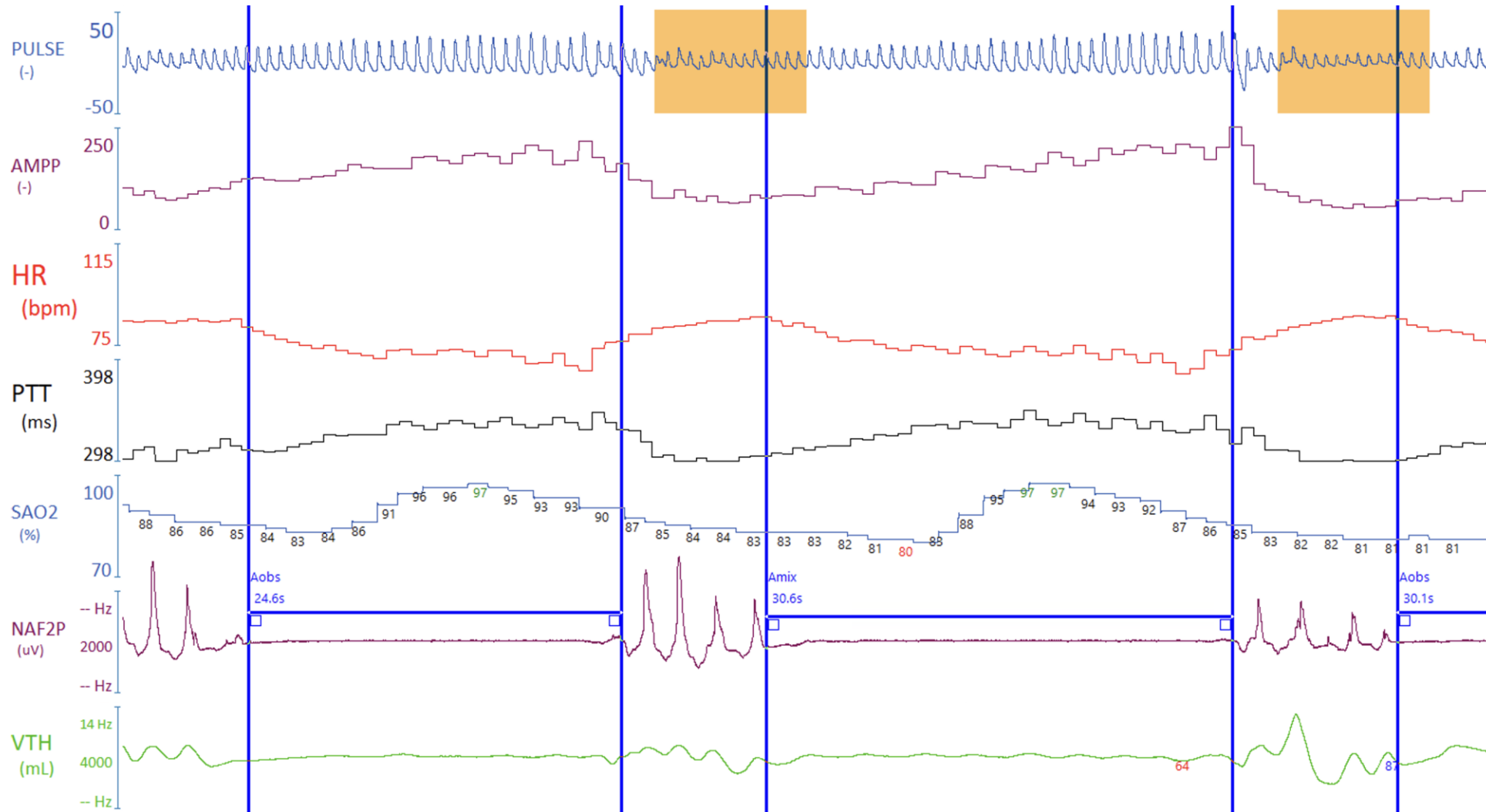


Drop computed according to moving average
window baseline (configurable)

PWAD correlated



+



Autonomic Arousals codes



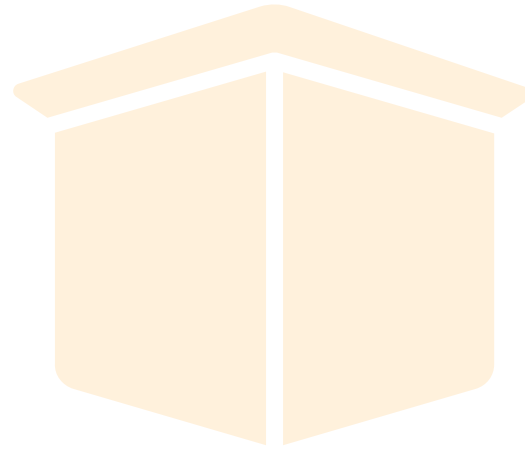
Micro-éveils autonomiques

2178	Nombre de Micro-éveil autonome détecté sur Pulse en stade 1	Nombre
2179	Nombre de Micro-éveil autonome détecté sur Pulse + HR en stade 1	Nombre
2180	Nombre de Micro-éveil autonome détecté sur PTT en stade 1	Nombre
2181	Nombre de Micro-éveil autonome en stade 1	Nombre
2182	Nombre de Micro-éveil autonome détecté sur Pulse en stade 2	Nombre
2183	Nombre de Micro-éveil autonome détecté sur Pulse + HR en stade 2	Nombre
2184	Nombre de Micro-éveil autonome détecté sur PTT en stade 2	Nombre
2185	Nombre de Micro-éveil autonome en stade 2	Nombre
2186	Nombre de Micro-éveil autonome détecté sur Pulse en stade 3	Nombre
2187	Nombre de Micro-éveil autonome détecté sur op Pulse + HR en stade 3	Nombre
(...)	(...)	(...)
2201	Index de micro-éveil autonome / TIB	Nombre / heure

23

codes

To be continued...



Meet us at our booth!

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Follow-up

- Center of gravity
- Alpha-Delta Sleep
- Heart Rate Variability (HRV)

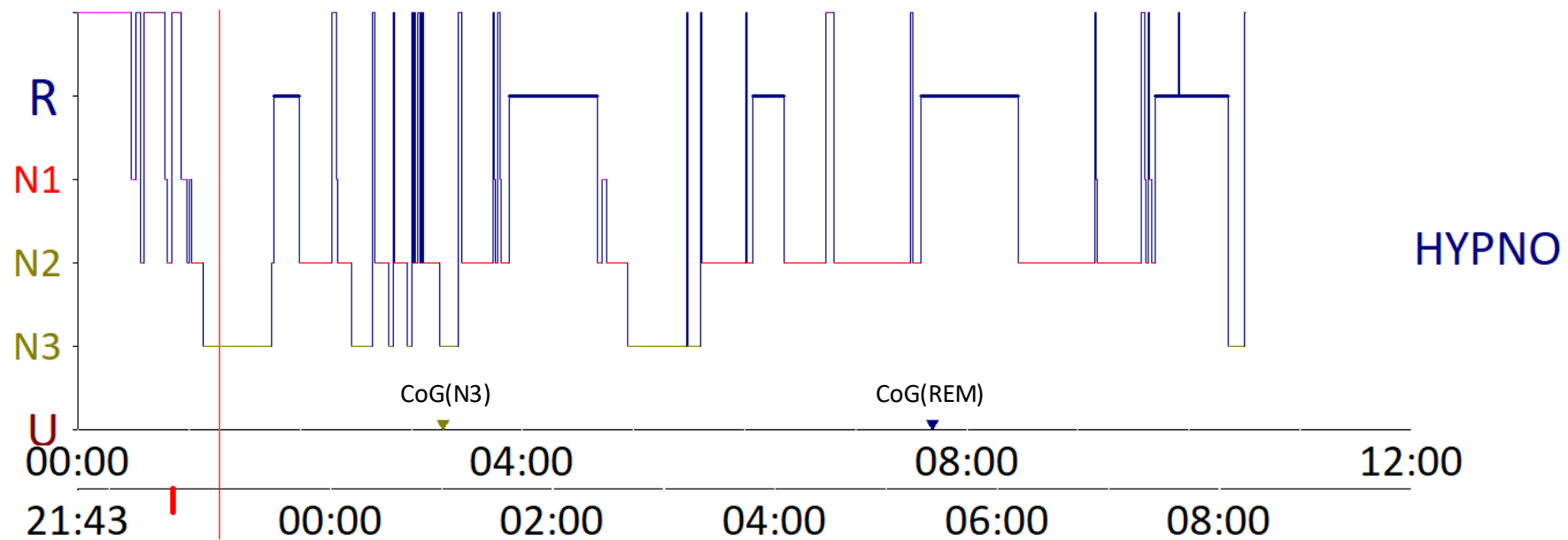


Tom van Rijn

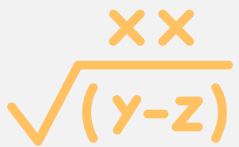
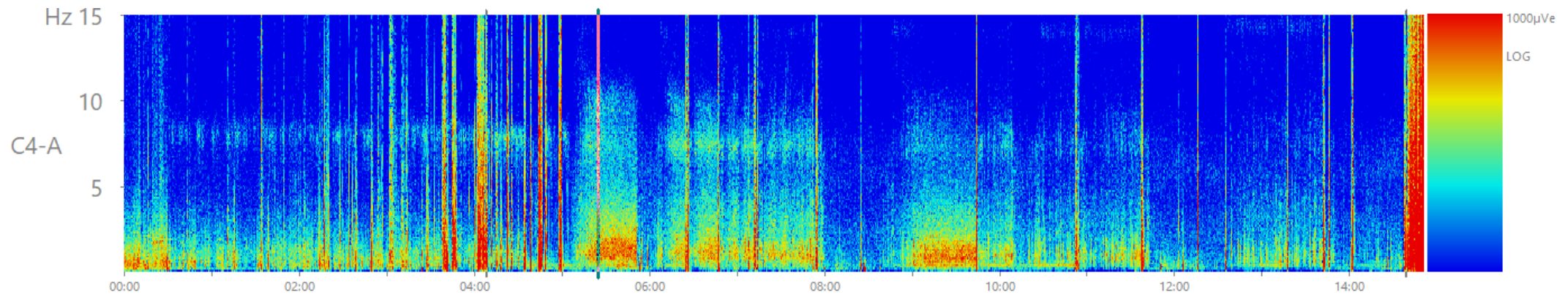
Centers of gravity explained



$$\text{Median}_{\text{stage}} = \text{time at which } \sum (\text{mins in stage before this time}) = \frac{1}{2} \cdot \sum (\text{mins in TST})$$

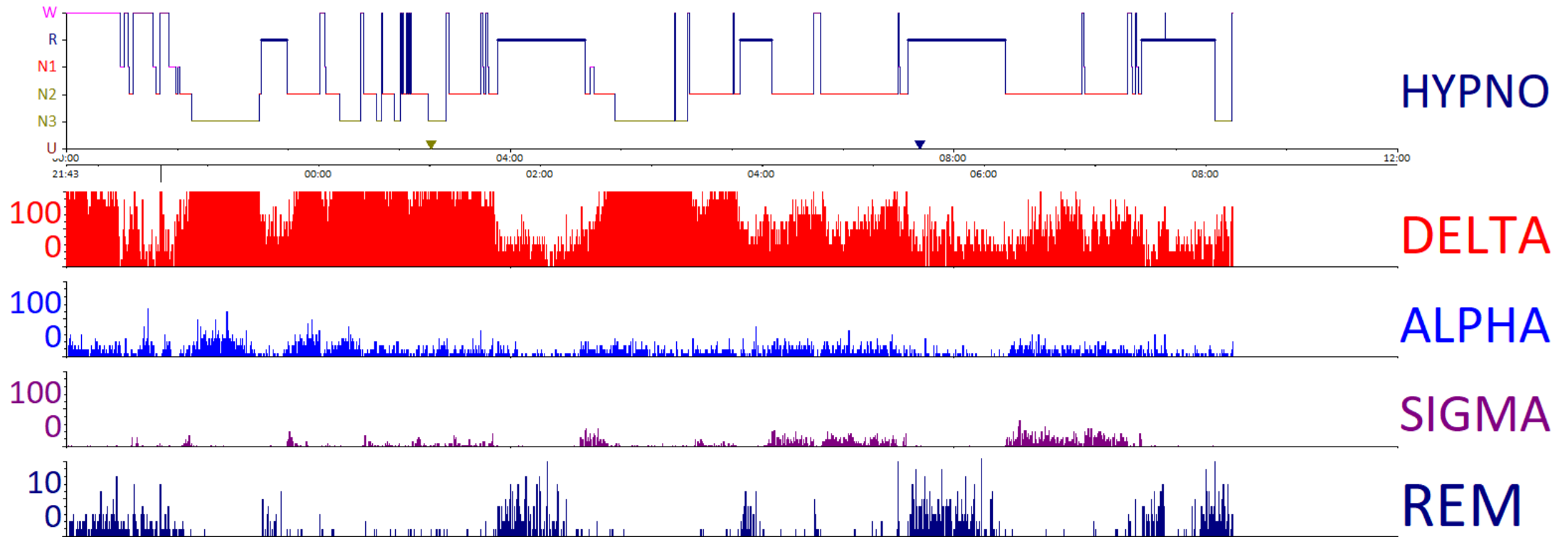


Alpha-Delta Sleep: spectrum



Note: Winrel implements multiple advanced spectrum analysis for ultra-short window frames.

Alpha-Delta Sleep: correlated



Alpha-Delta Sleep codes

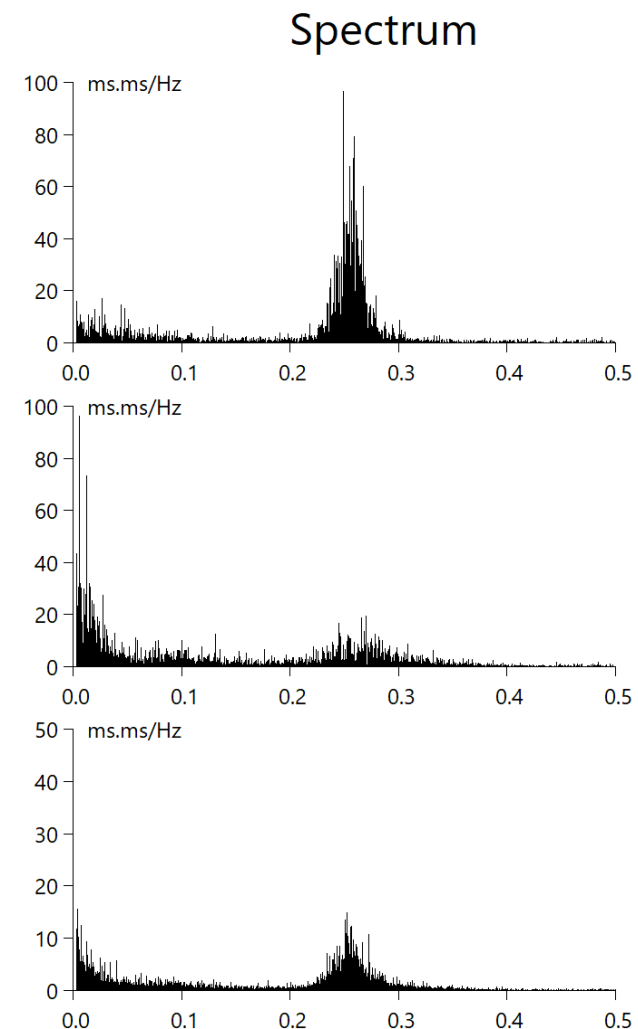
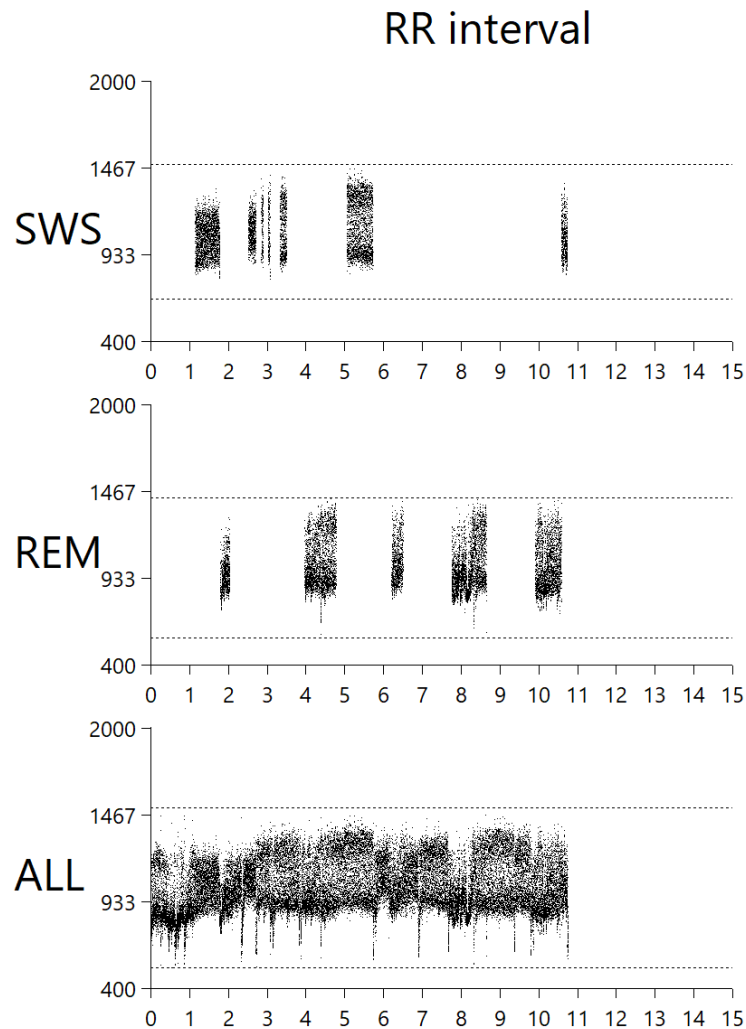


207	Intrusion de l'alpha en stade éveil	% du temps d'éveil contenant de l'alpha
208	Intrusion de l'alpha en stade 1	% du temps en stade 1 contenant de l'alpha
209	Intrusion de l'alpha en stade 2	% du temps en stade 2 contenant de l'alpha
210	Intrusion de l'alpha en stade 3	% du temps en stade 3 contenant de l'alpha
211	Intrusion de l'alpha en stade 4	% du temps en stade 4 contenant de l'alpha
212	Intrusion de l'alpha en stade REM	% du temps en stade REM contenant de l'alpha
213	Intrusion de l'alpha en SWS	% du temps en SWS contenant de l'alpha
214	Intrusion de l'alpha en stade 1+2	% du temps en stades 1+2 contenant de l'alpha
215	Intrusion de l'alpha	% du temps enregistré contenant de l'alpha
1259	Intrusion de l'alpha en NREM	% du temps NREM contenant de l'alpha

10

codes

Heart Rate Variability (HRV)



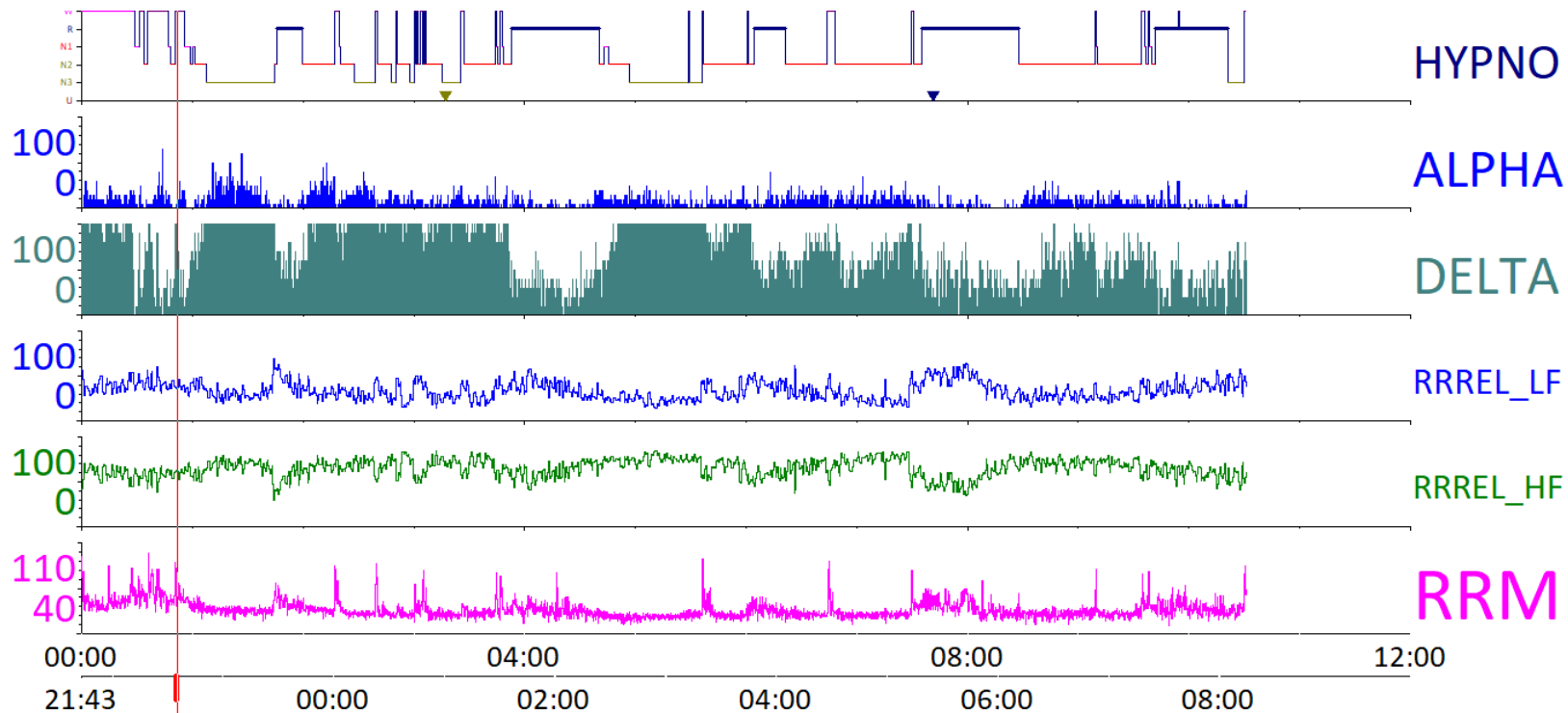
Heart Rate Variability (HRV)



Sympathetic
LF: 0.04Hz to 0.15Hz



Parasympathetic
HF: 0.15Hz to 0.4Hz



Heart Rate Variability (HRV) codes



2527	Aire des LF (0.04 → 0.15 Hz) du centre de gravité REM (± 10 min)	En ms^2
2528	Aire des HF (0.15 → 0.40 Hz) du centre de gravité REM (± 10 min)	En ms^2
2529	Aire des LF (0.04 → 0.15 Hz) du centre de gravité SWS (± 10 min)	En ms^2
2530	Aire des HF (0.15 → 0.40 Hz) du centre de gravité SWS (± 10 min)	En ms^2
2531	HRV du centre de gravité REM (± 10 min) = HFREM/LFREM	En %
2532	HRV du centre de gravité SWS (± 10 min) = HFN_3/LFN_3	En %

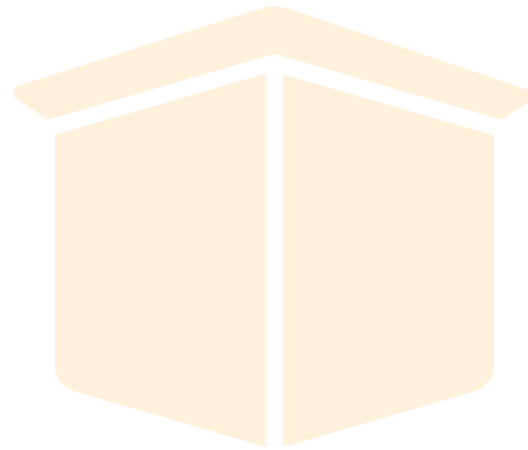
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codes

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Thank you



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Articles:

The hypoxic burden of sleep apnea predicts cardiovascular disease-related mortality: the Osteoporotic Fractures in Men Study and the Sleep Heart Health Study

Ali Azarbarzin^{1 *}, Scott A. Sands¹, Katie L. Stone^{2,3}, Luigi Taranto-Montemurro¹, Ludovico Messineo¹, Philip I. Terrill⁴, Sonia Ancoli-Israel^{5,6}, Kristine Ensrud⁷, Shaun Purcell^{1,8}, David P. White¹, Susan Redline¹, and Andrew Wellman

Sleep apnea-specific hypoxic burden, symptom subtypes, and risk of cardiovascular events and all-cause mortality
Trzepizur W, Blanchard M, Ganem T, Balusson F, Feuilloy M, Girault JM, Meslier N, et al.

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