

## Ongoing research's report End of Phase III

With the end of Phase III, there is the first year of recording at one second epoch.  
It is time to move from paper and pencil to computers.

Here the sequence of data management until now (July 2017).

Raw data are files long more or less a day. That is due to the fact that the maximum recording time of the Motionwatch8 at one second epoch is 36 hours.

Using Motionware software

- the files are joined in segments long more or less 10 days. That is due to the fact that my spreadsheet uses up to one million lines.
- Intervals that were marked with the Motionwatch8 marker are modified from 0 to n/a
- The corrected files are exported as :CSV files. There are 4 columns (written on the first line): day, time, counts and lux. Those are the files sent to Physionet.org. (waiting for publishing) , resulting in 31.576.501 data lines as listed below.

Deluccaphase2&3

File name .CSV	Starting date	Starting time	End time
CET –	CentralEuropean Time Summer		(CEST) (UTC+2)
Raw101	19/06/2016	09:52:00	23:59:59
Raw102	01/07/2016	00:00:00	23:59:59
Raw103	07/07/2016	00:00:00	23:59:59
Raw104	18/07/2016	00:00:00	23:59:59
Raw105	27/07/2016	00:00:00	23:59:59
Raw106	05/08/2016	00:00:00	23:59:59
Raw107	13/08/2016	00:00:00	23:59:59
Raw108	23/08/2016	00:00:00	23:59:59
Raw109	02/09/2016	00:00:00	23:59:59
Raw110	12/09/2016	00:00:00	23:59:59
Raw111	20/09/2016	00:00:00	20:16:59
Raw112ok	29/09/2016	20:17:00	22:05:02
Raw114	11/10/2016	22:05:03	23:59:59
Raw115	20/10/2016	00:00:00	02:59:59
CET –	Central European Time		(UTC+1)
Raw116	30/10/2016	02:00:00	23:59:59
Raw117	09/11/2016	00:00:00	23:59:59
Raw118	19/11/2016	00:00:00	23:59:59
Raw119	29/11/2016	00:00:00	23:59:59
Raw120	09/12/2016	00:00:00	23:59:59
Raw121	18/12/2016	00:00:00	23:59:59
Raw122	27/12/2016	00:00:00	23:59:59
Raw123	05/01/2017	00:00:00	23:59:59
Raw124	15/01/2017	00:00:00	23:59:59
Raw125	22/01/2017	00:00:00	23:59:59
Raw126	31/01/2017	00:00:00	23:59:59
Raw127	09/02/2017	00:00:00	23:59:59

Raw128	19/02/2017	00:00:00	23:59:59
Raw129	28/02/2017	00:00:00	23:59:59
Raw130	09/03/2017	00:00:00	23:59:59
Raw131	19/03/2017	00:00:00	01:59:59
CET –	Central European Time Summer (CEST) (UTC+2)		
Raw131bis	30/03/2017	03:00:00	23:59:59
Raw132	29/03/2017	00:00:00	23:59:59
Raw133	08/04/2017	00:00:00	23:59:59
Raw134	17/04/2017	00:00:00	23:59:59
Raw135	27/04/2017	00:00:00	23:59:59
Raw136	04/05/2017	00:00:00	21:28:59
Raw137	07/05/2017	21:29:00	23:59:59
Raw138	18/05/2017	00:00:00	23:59:59
Raw139	28/05/2017	00:00:00	23:59:59
Raw140	07/06/2017	00:00:00	23:59:59
Raw141	17/06/2017	00:00:00	19/06/2017 21:07:00

Then, using OpenCalc

- “n/a” Counts and Lux values are set as “-1” and data divided in 9 columns: year, month, day, hour, minute, seconds, counts, lux integers, lux decimals (file renamed from 201 on)

Then, with Octave language,

- Activity counts are extracted and saved as .MAT files (first line always zero, one column) with the same name.. Out of 31.576.501 data lines, there are 24.936.212 zeros, 1.034.485 n/a and 5.605.804 values., i.e .78,97%, 3,28% and 17,75%.
- Activity counts are joined in one file with name **Tot MW8.mat**
- Sequences of values and zero are computed and maximum values extracted adding 3 columns, Sequence of zeros (from -1 down), Sequence of values (from 1 up) , Max. Saved as **TotMW8s.mat** and also takes the Max column and save it as **MaxTotMW8s.mat**

- Total time in zero series is 24.936.212 vs non-zero series total time of 5.605.804 . It is a ratio of 81,5%. The minimum range needed for such an evaluation is 8024 sec (longest positive plus longest negative series).  
If we plot minimum and maximum percent of zero series over 3 hours( 10.800 seconds), 6 hours, one day, one week, two weeks epochs over the year, we find the following.

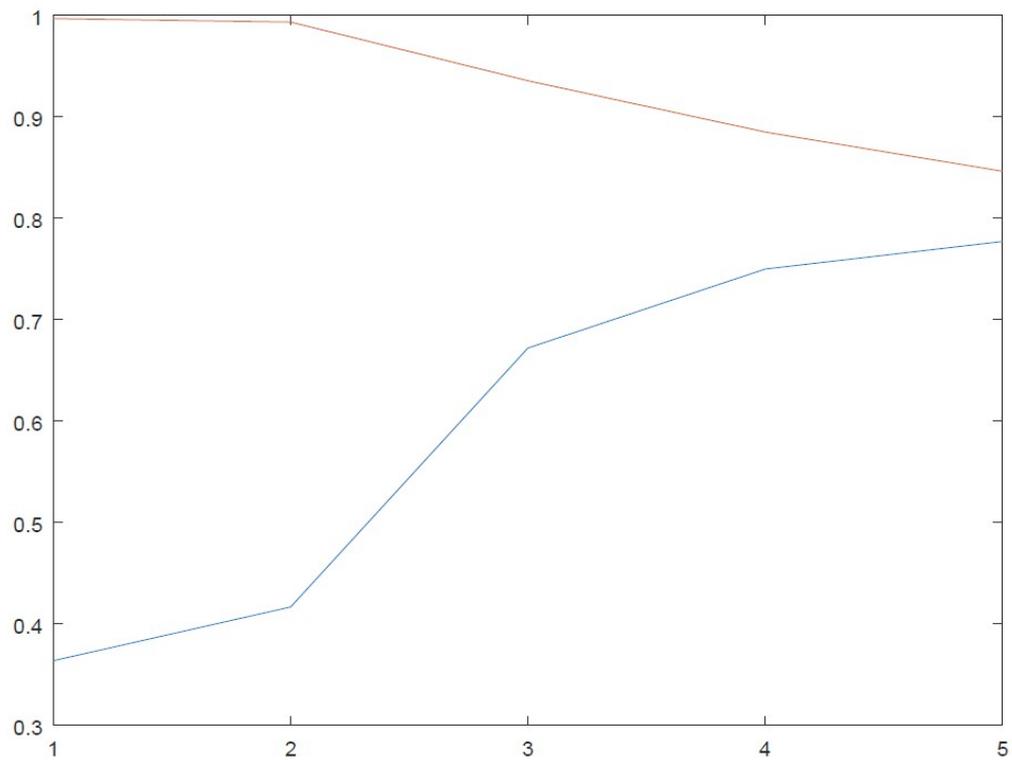


Fig.25 – Min and max percent of zeros in epochs of 3 h, 6h, one day, one week, two weeks computed over the Phase 2&3 year

That means that a single recording in any single recording of those epoch will not give a meaningful information about the total computed over the year.

- From **MaxTot MW8s.mat** It is computed the number of sequences with the same length for negative and positive values and stored in file **DistFreq.mat**. Then the total time spent in each sequence is stored in the file **DistTempo.mat**. Max positive and negative ranges are stored in the file **Ranges.mat**.
  - It is also computed the total time spent in each 0 sequence in the range 1-59 seconds. It is total of 8.058.741 seconds (26,4,% of measured time 30.542.015). The maximum length of the non zero series is about 10 minutes instead of 90 as computed with one minute epoch, showing the effect of the zeros hidden in the non zero one minute epoch.

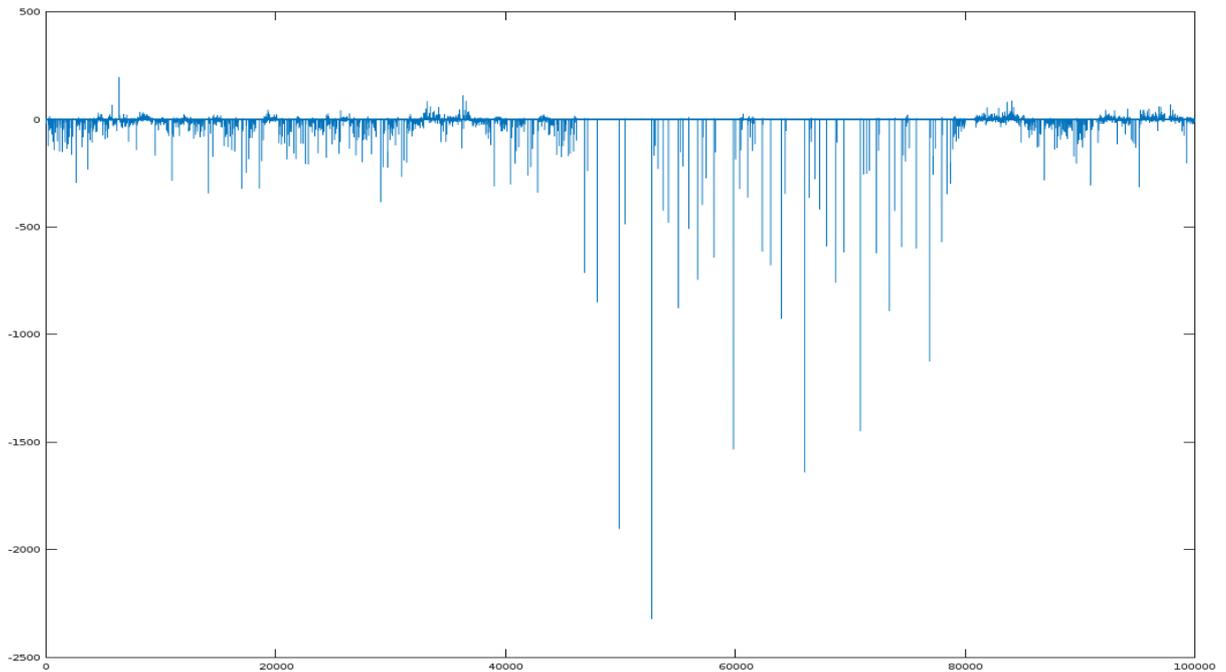


Fig.26 – Day 1 – Phase III – Start 09:52:00  
 X axis , one day is 86400 seconds – Y-axis length of the series in seconds, from  
**MaxTotMW8s.mat**

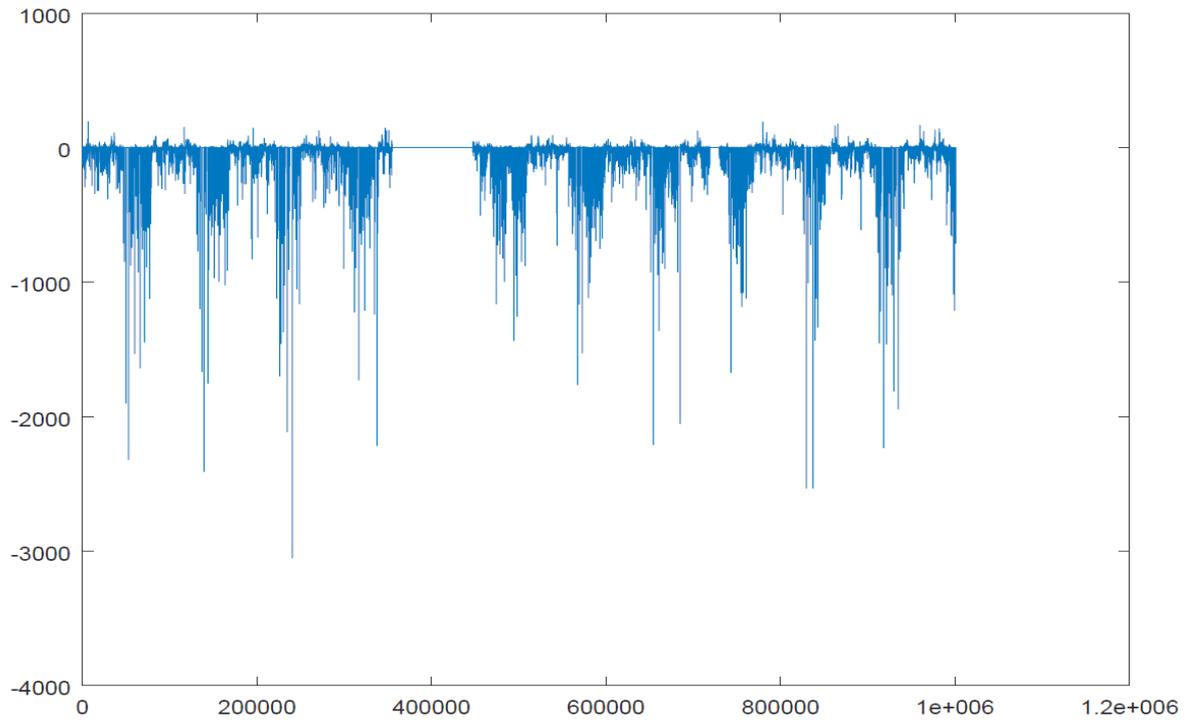


Fig.27 – First file – Phase III – Twelve days  
X axis , one day is 86400 seconds – Y-axis length of the series in seconds