Acceleration during parachute opening

2020/11/17 - fred - v 1.1

Goals

The goal is to have a idea of the force apply on the mass during an EN 12491 Load test session. For that an accelerometer has been installed on the dummy mass.

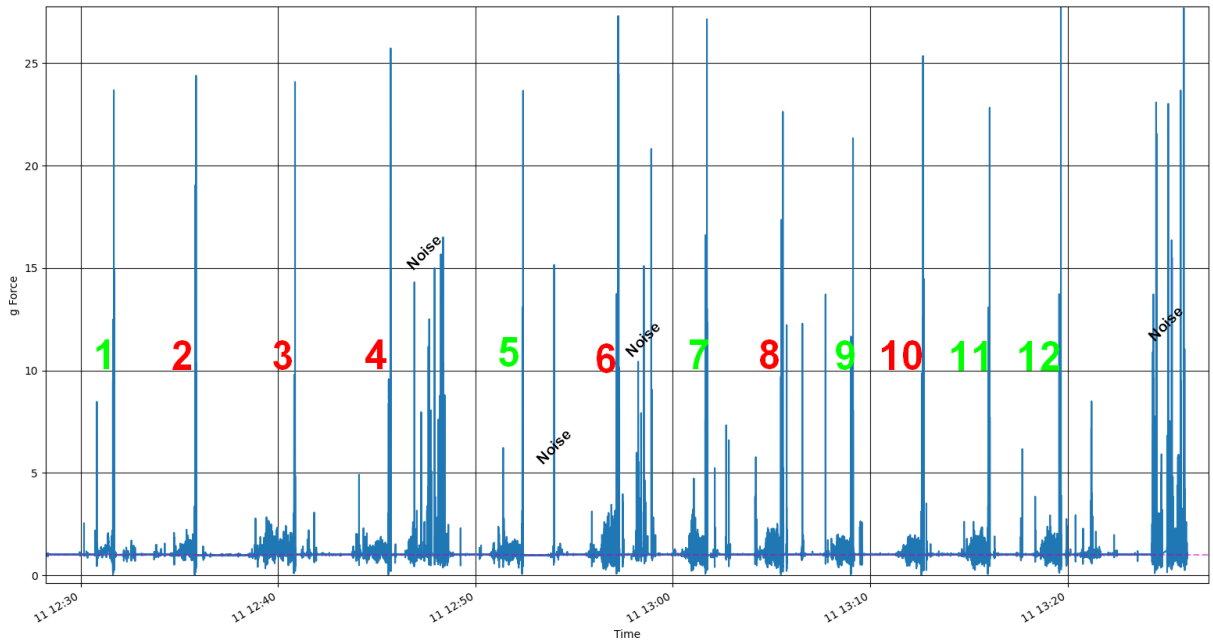
Contex

- Test done by Para-test on 11/11/2020.
- Number of parachutes tested : 12.
- All tests has been perform at 40m/s horizontal speed.
- Sensor :
  - WitMotion WT901SDCL.
  - log acceleration (x,y,z) at 200 Hz with timestamp
  - Max : 16 g on each axis. (we checked that we never exceed 16g during and opening shock , but it was reach several time during ground shock)
  - amazon link
  - manufacturer website
- Units:
  - Mass : Kg
  - Force : daN
  - g = 9.81 m/s2

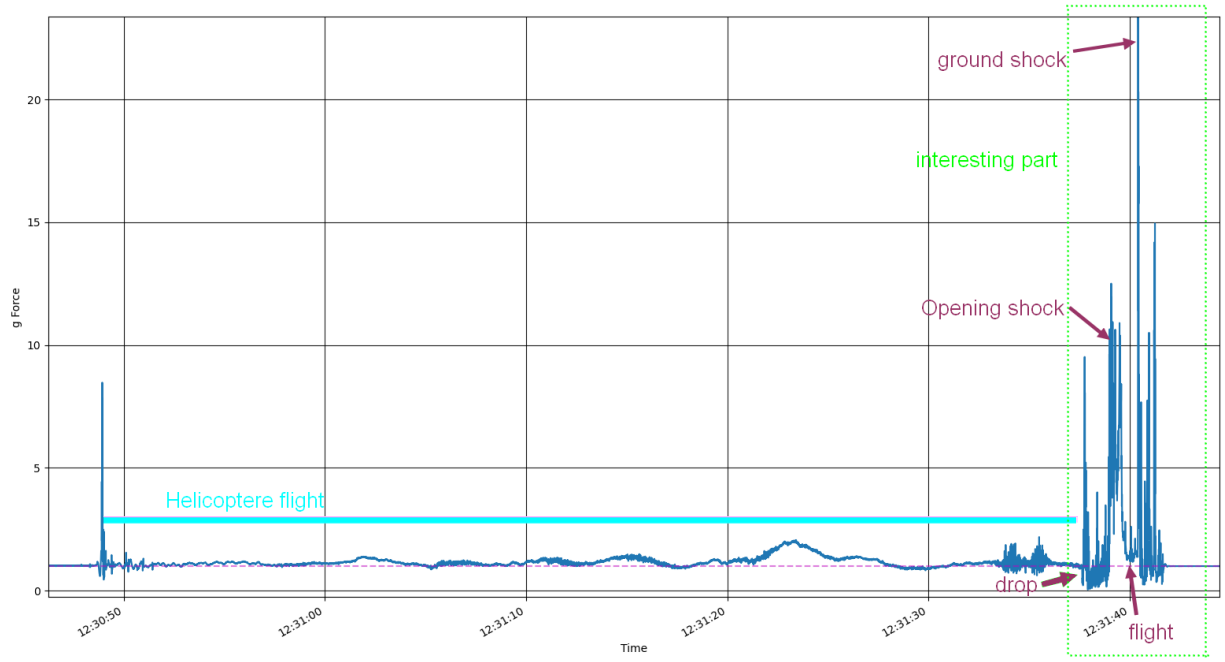
Overview

This is an overview of the full log . With the index of the drop.

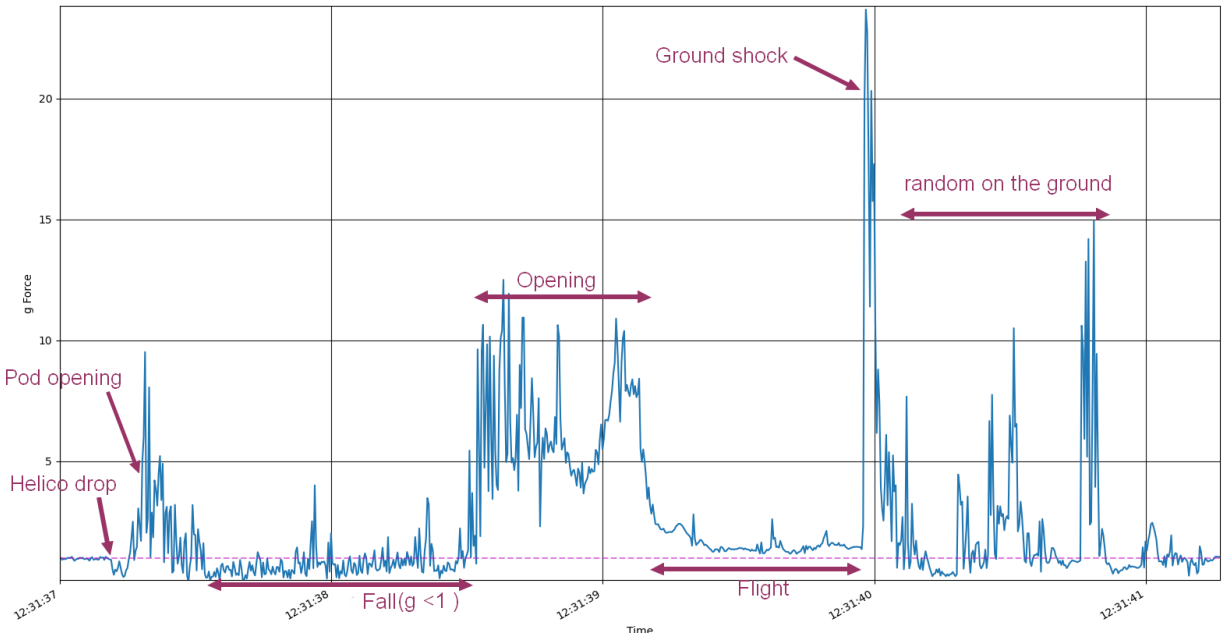
Note : , right click , view image to explore all the graph



When we zoom on the first drop :



Zoom on the opening of the first drop :



Results:

This table resume all the test parameters and the calculated force :

```
force [daN] = mass [kg] * max_g * g [m/s2]
```

Drop Id	Mass [Kg]	Pass/Fail	Max g force [g]	Start [hh:mm:ss.s]	Force [daN]
1	230	**Pass**	12.5	12:31:38.0	**2820**
2	220	Fail	19	12:35:47.0	**4100**
3	220	Fail	9.8	12:40:48.0	**2115**
4	220	Fail	9.36	12:45:35.0	**2020**
5	135	**Pass**	13.1	12:52:21.0	**1735**
6	125	Fail	13.7	12:57:08.0	**1680**
7	120	**Pass**	16.7	13:01:39.0	**1966**
8	115	Fail	17.3	13:05:29.0	**1952**
9	100	**Pass**	11.7	13:09:01.0	**1148**
10	100	Fail	9.54	13:12:36.0	**936**
11	100	**Pass**	13.1	13:15:58.0	**1285**
12	80	**Pass**	11.8	13:19:35.0	**926**

Note:

- Start time is just approximative to get an idea on the full log, no precise criteria were use to set it.

Zoom on each drop

All graphs:

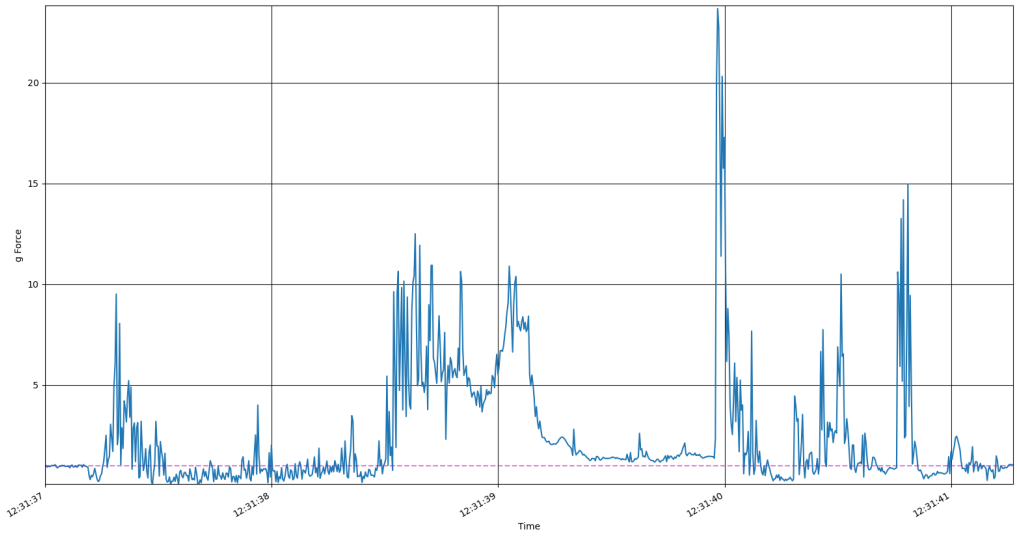


Figure 1: Drop_1

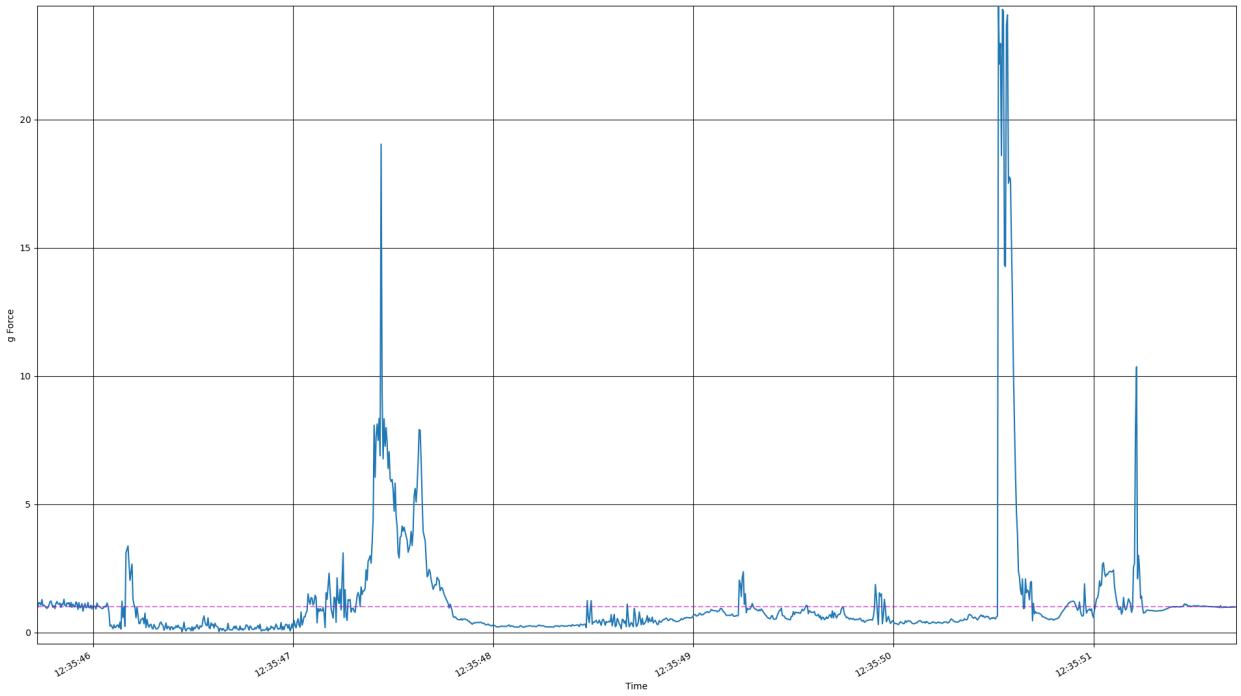


Figure 2: Drop_2

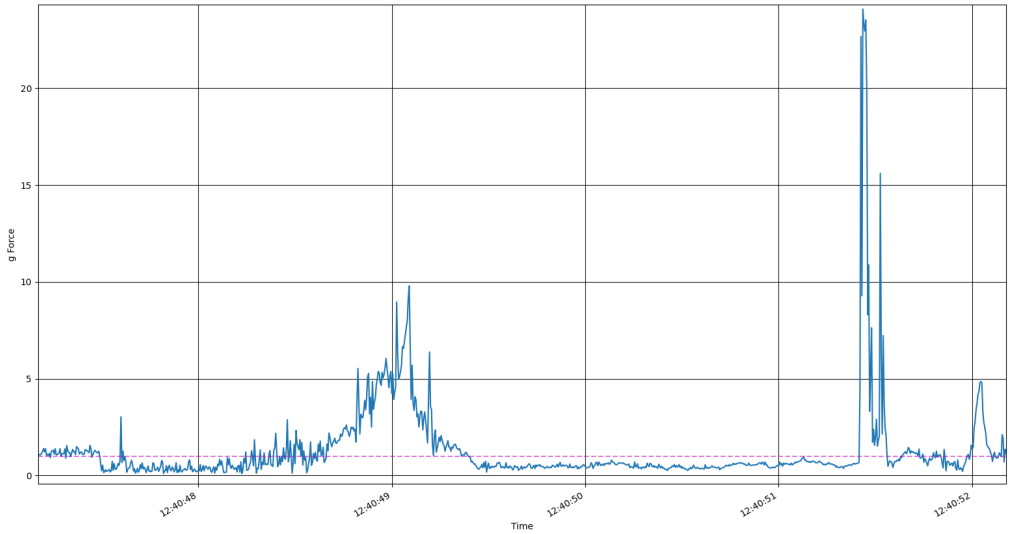


Figure 3: Drop_3

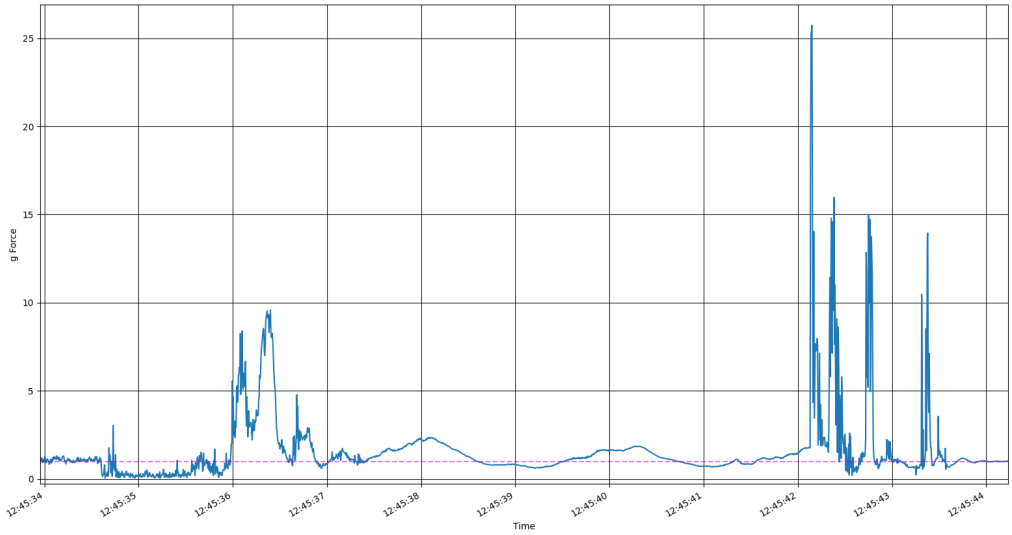


Figure 4: Drop_4

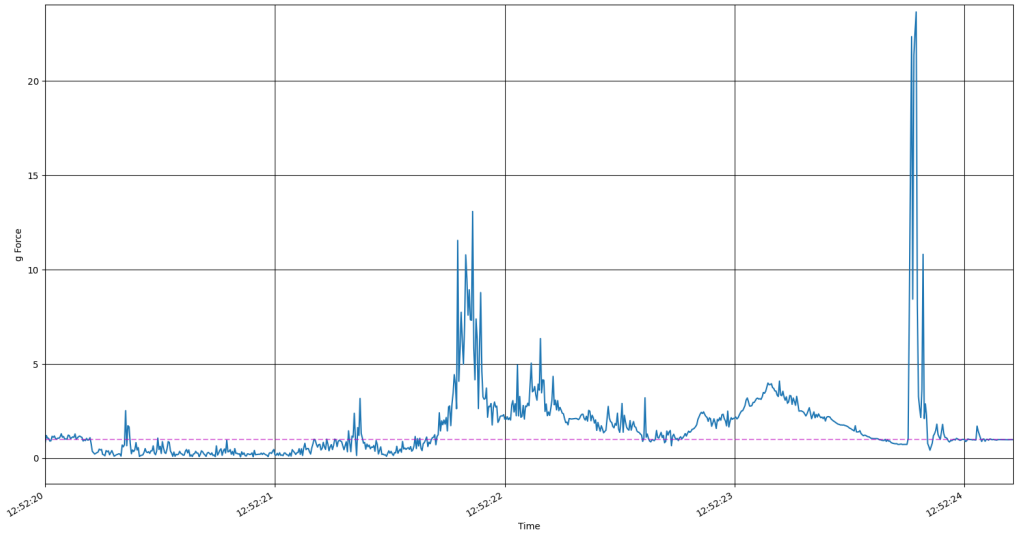


Figure 5: Drop_5

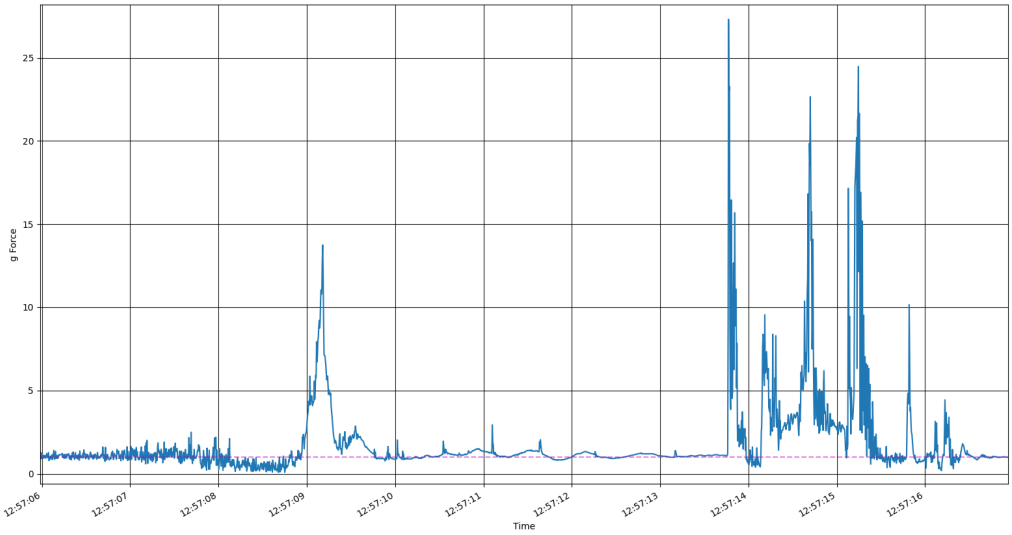


Figure 6: Drop_6

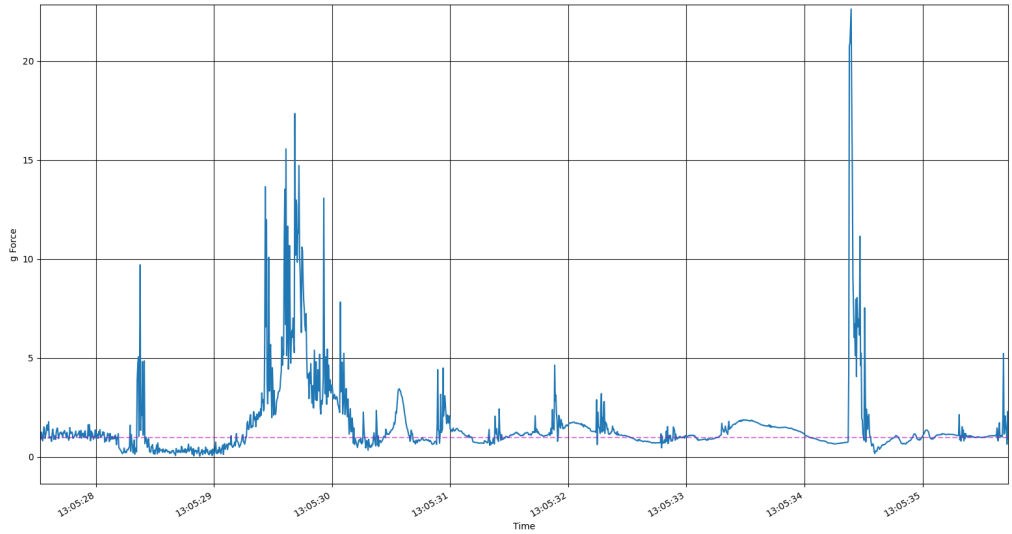


Figure 7: Drop_7

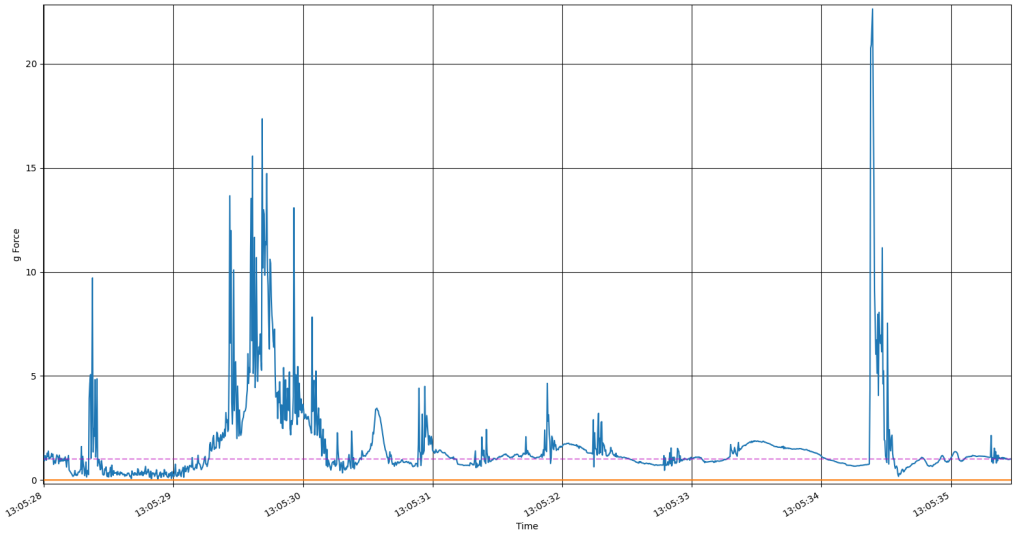


Figure 8: Drop_8

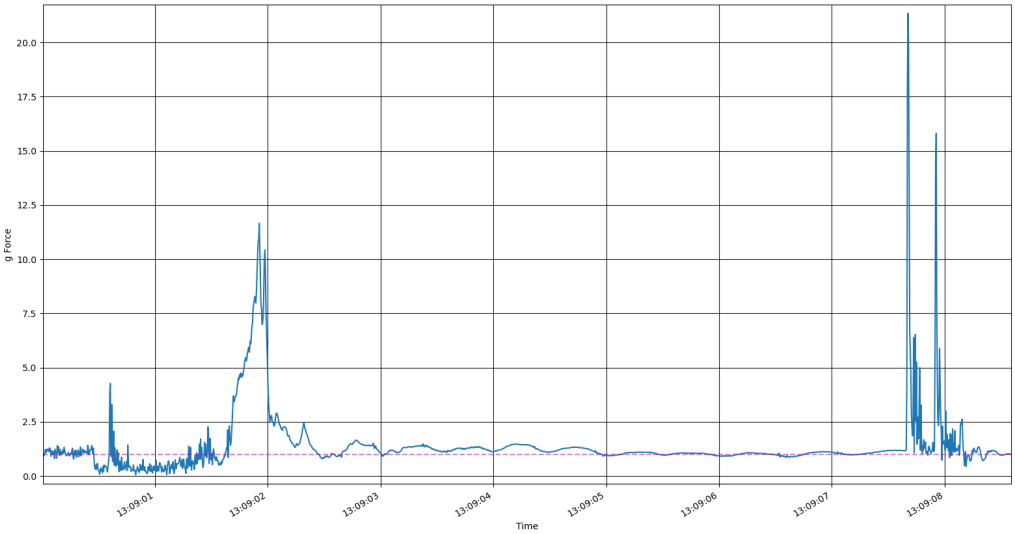


Figure 9: Drop_9

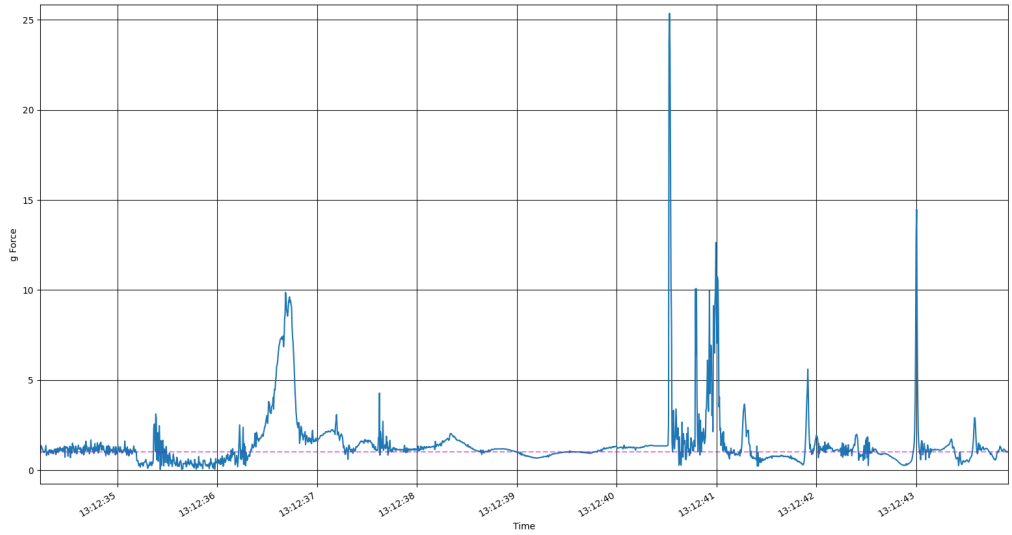


Figure 10: Drop_10

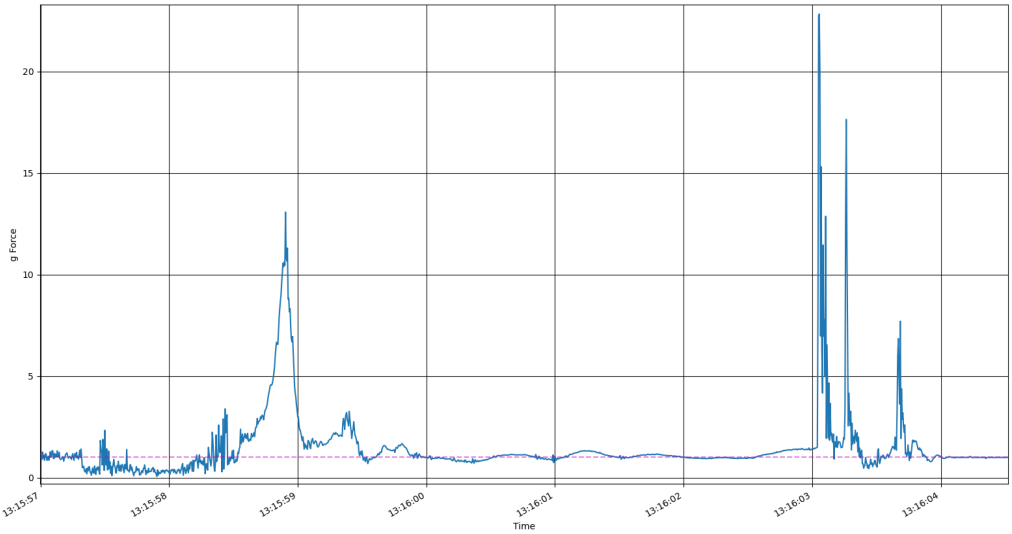


Figure 11: Drop_11

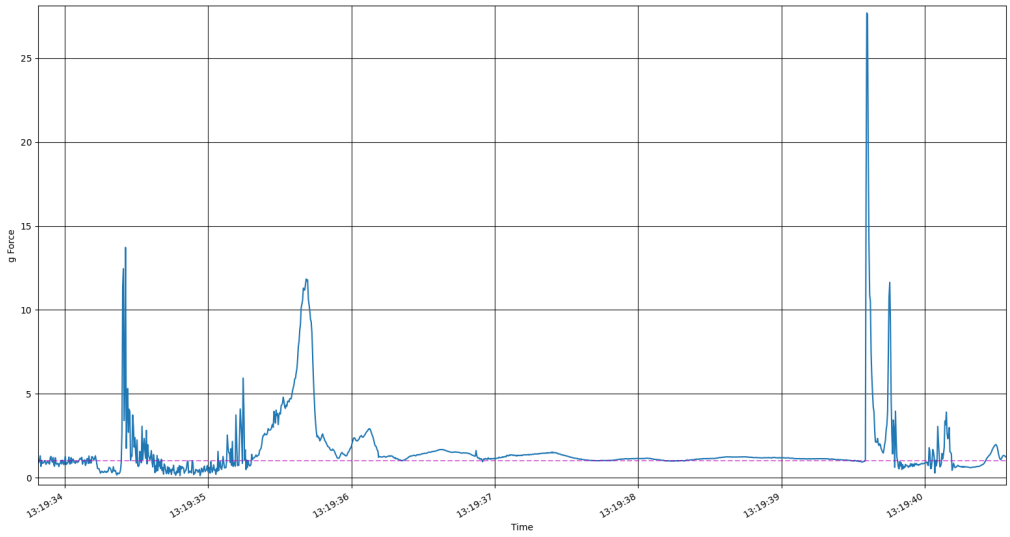


Figure 12: Drop_12