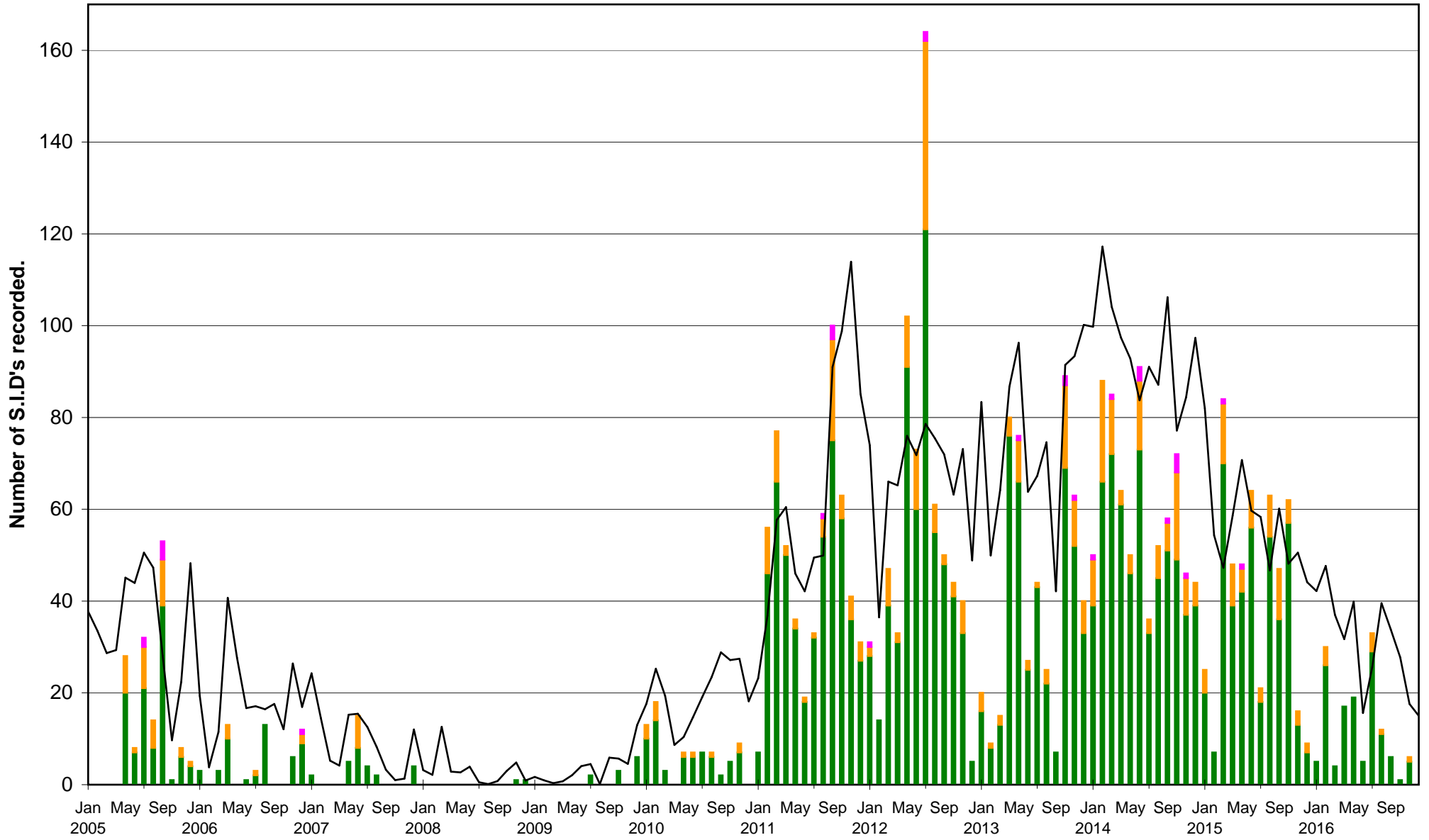
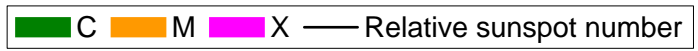
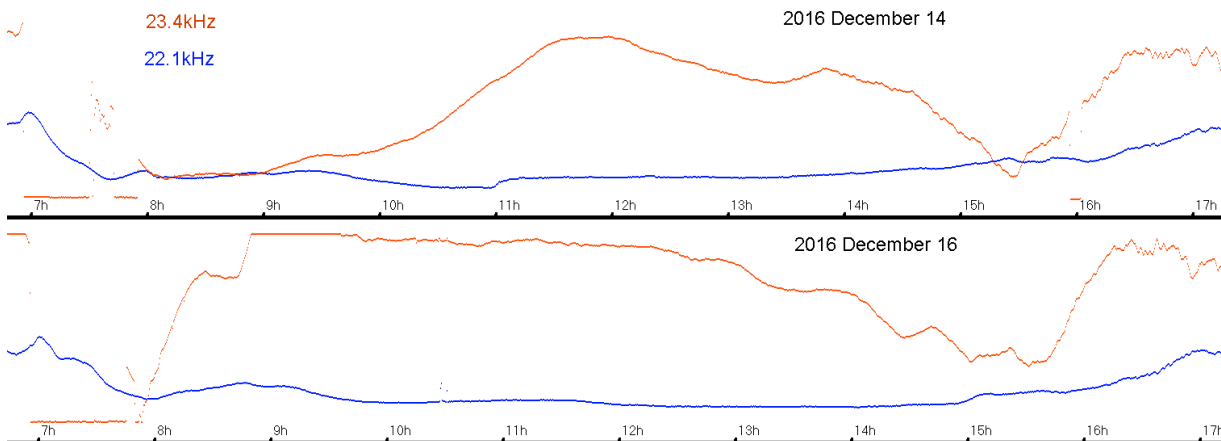


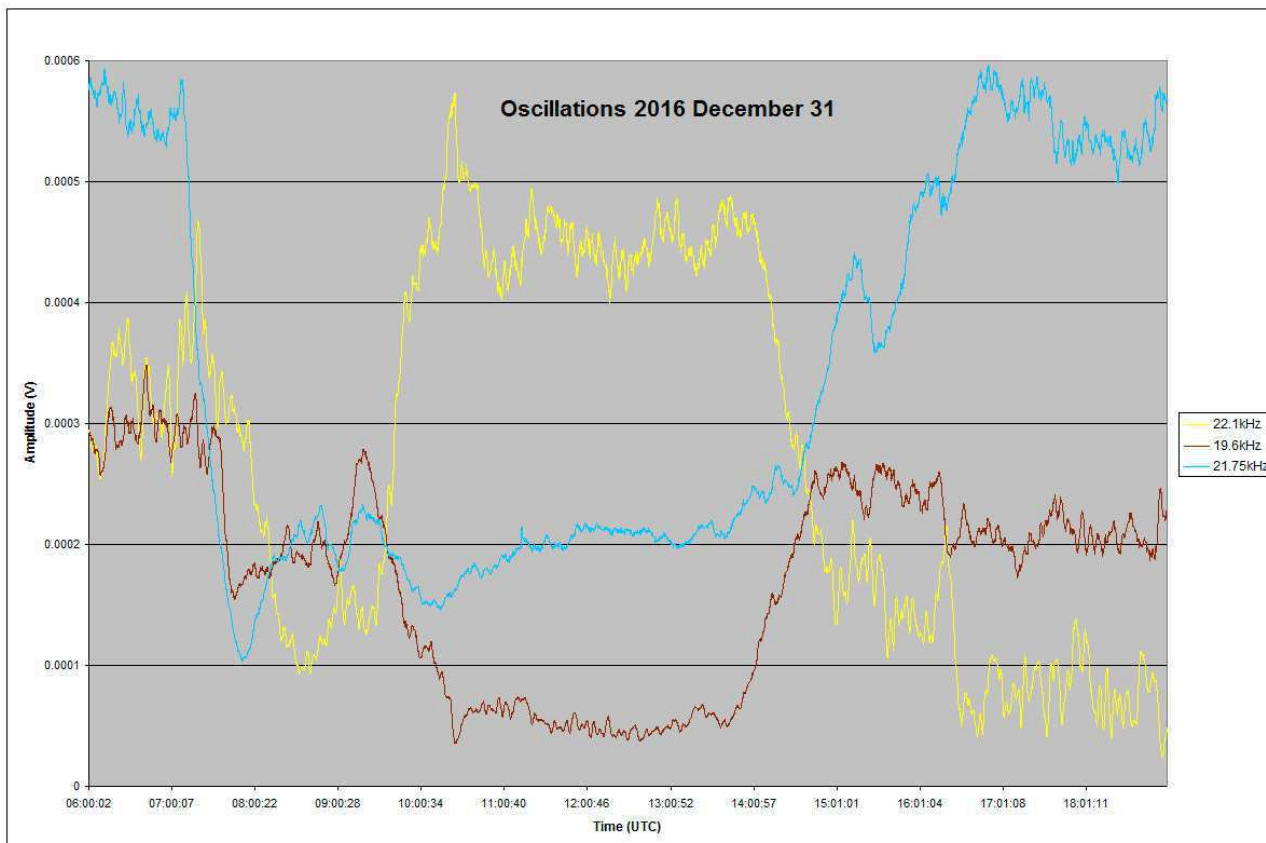
VLF flare activity 2005/16.



For the first time since 2010 December, we have not recorded any SIDs. There have been very few sunspot regions visible, and those that were present have been very small and stable. The strongest flare in the GOES15 X-ray data was C4.0, at 17:15UT on the 10th. The background X-ray flux was about B1 prior to this flare, but then dropped to A7 – A8 levels for the rest of the month. There were a few very small (B1 – B2) flares over this period, but for most of the time the Sun remained very quiet. This has led to some very strange looking diurnal curves, with plenty of instability and general noise, but no sustained oscillations.

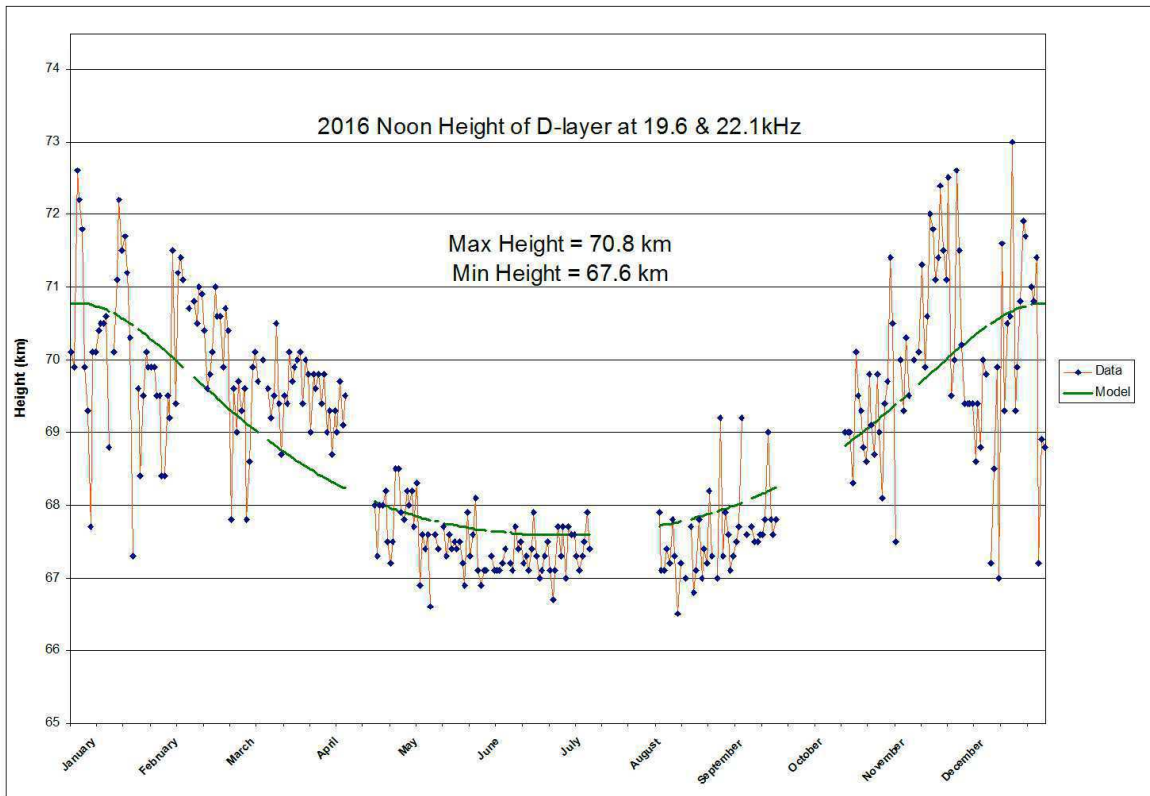


These are just two extreme examples of my own recordings. On both days the 23.4kHz signal level is quite high just before the morning break, but on the 14th the sunrise dip seems to last until nearly midday, while on the 16th there is a rapid rise with the receiver saturating by 09:00.



This recording is from Mark Edwards on the 31st. The 21.75kHz signal (blue) shows a very asymmetric diurnal

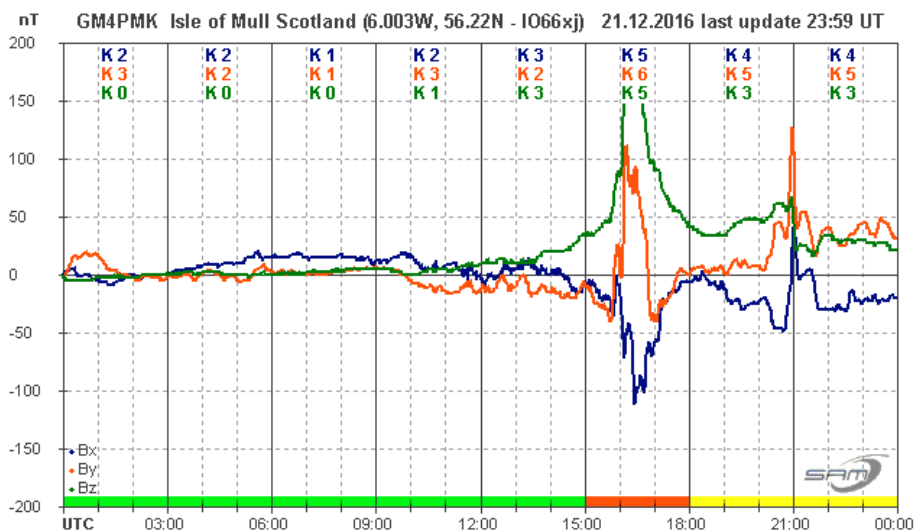
curve, while 22.1kHz (yellow) shows significant noise and instability. 19.6kHz (brown) is also quite noisy, but at a much lower level. Mark has also produced his annual chart of D-region height for 2016:



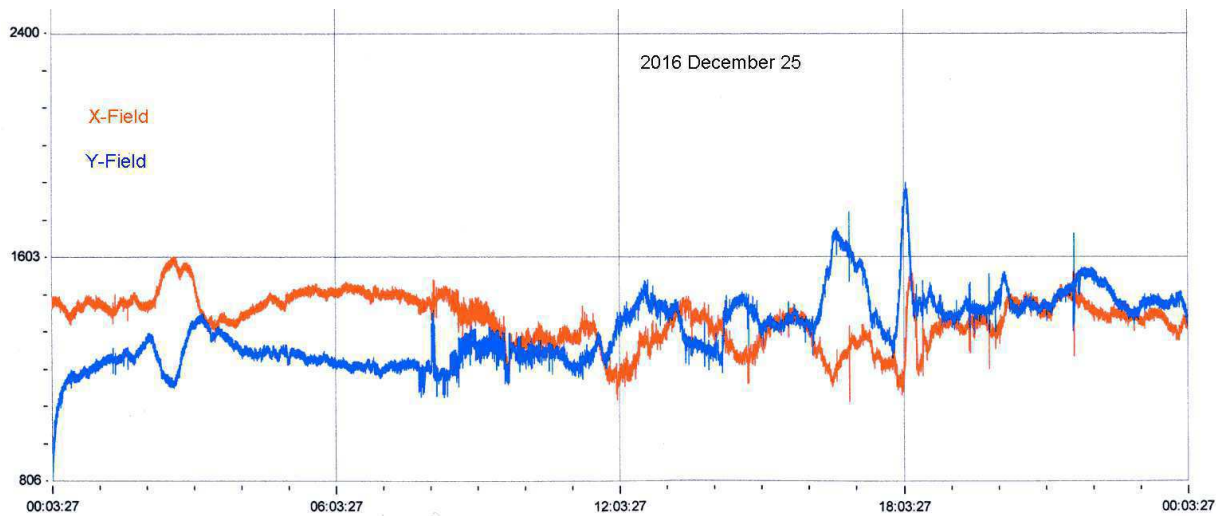
As with previous years, the signal instabilities recorded during the winter months lead to a wide variation in measured height (red trace) compared to that in the summer. The model output (green) will be influenced by this, but does still show similar maximum and minimum values to last year.

MAGNETIC OBSERVATIONS.

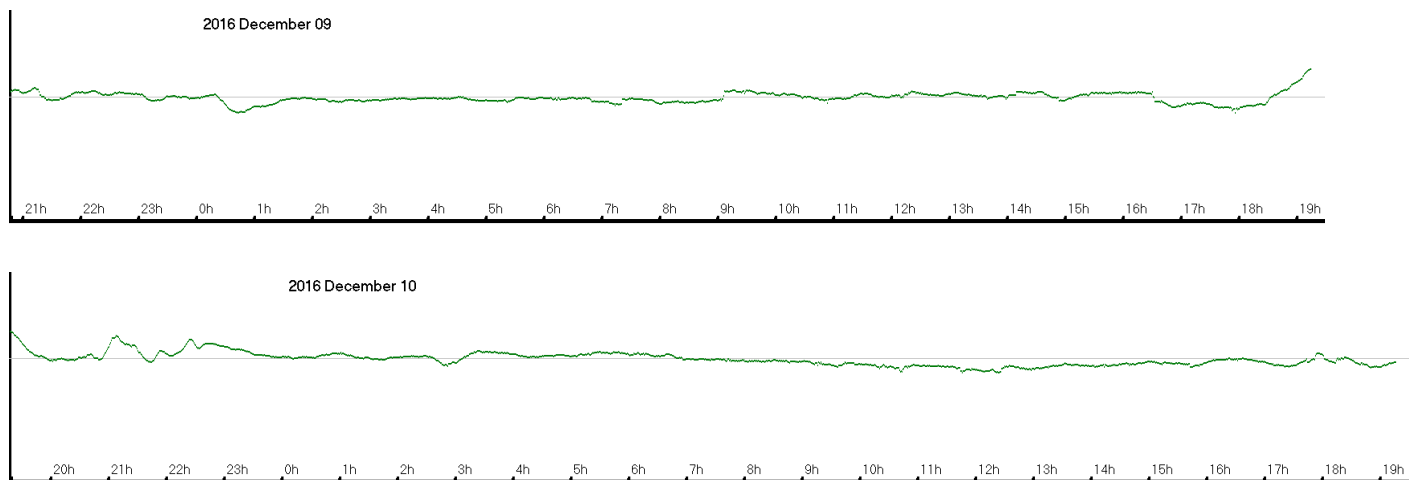
As there were no major flares in December, all of the magnetic activity recorded is from coronal hole effects. The large hole seen in recent months has broken up into several smaller holes, but is still very evident in the Bartels diagram, slowly drifting a few days later each month.



This recording by Roger Blackwell shows the effect of the sudden rise in solar wind speed after 15:00UT on the 21st. My own single-axis magnetometer recorded a peak of 137nT at 16:30, followed by a much smaller peak at 21:00. A less active disturbance continued through to December 27th. This chart from December 25th by Colin Clements is more typical of this period:



The active period over the 9th and 10th was due to a co-rotating interaction region combined with a HSS from a long narrow coronal hole stretching from the south pole to mid northern latitudes.



The peak of the activity on the 9th occurred just at the time when I downloaded the magnetometer data into the PC, measuring about 92nT in my recording. This had faded away by the early morning of the 11th.

While the VLF SID activity in 2016 is considerably lower than in 2015, magnetic activity levels have been similar. The Bartels diagram shows that in 2013, nearer to the sunspot peak, magnetic activity was actually much lower. 2017 will prove to be an interesting year as the minimum of cycle 24 was predicted to be 2018 or 2019.

Magnetic observations received from Roger Blackwell, Colin Clements, Gonzalo Vargas, John Cook.

