

## *White Paper - Solar Cycle Forecast*

Hello,

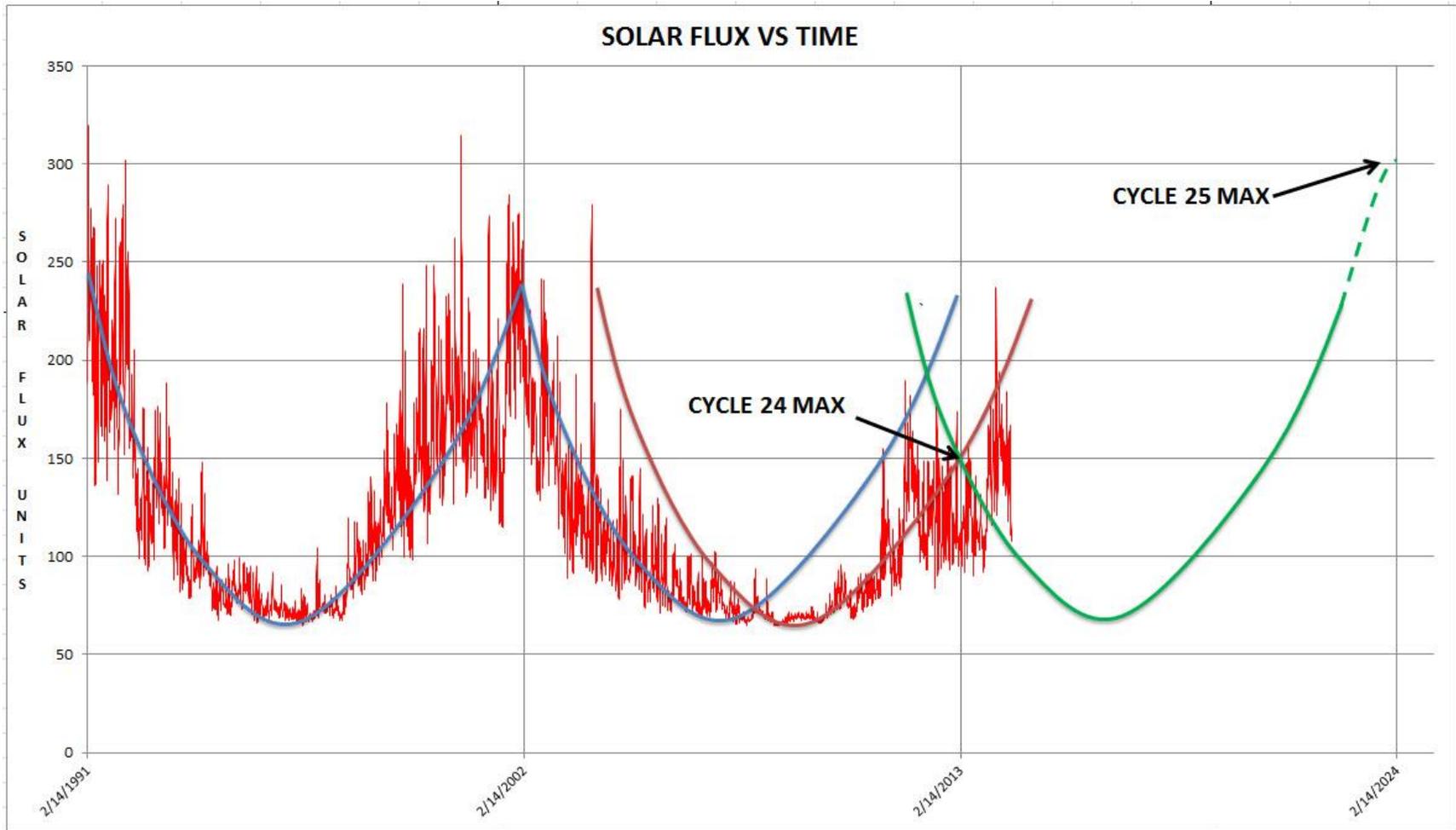
My name is Jerry VE6TL, and I was the one that did the analysis on the 304A data from the two different sources, which HamQSL published on their website some time ago (results are displayed in the graph below). I just wanted to share with you the results of my solar forecast which was made late in 2010. Referring to the Figure 1 below, the construction was as follows:

1. Fit a parabola (blue curve) through the peak of Cycle 22 to peak of Cycle 23. Note that the 11 year demarcations are based on curve fitting that started at the peak of Cycle 18 (See Figure 2 below). This works out to the peak corresponding to February 14, 1947, February 14, 1958, etc.
2. Copy and paste this parabola starting at the peak of Cycle 23 to predict the peak of Cycle 24.
3. After noting the exactly two year delay at the bottom of Cycle 23, slide the parabola two years to the right (brown line)
4. Assuming the peak to be February 14, 2013, copy and paste the parabola (green line) to start the next cycle, to predict the top of Cycle 25.

So how well has this worked? If you integrate the areas above and below the predicted curves, centered around February 14, 2013, it appears that the overshoots cancel pretty much with the undershoots. In other words, it appears that the prediction has worked out fairly well. And based on the green line, I feel confident that we are now on our way down towards solar minimum. It is clear that 10m and 12m are presently dying at this northern latitude. The good news is that we should expect 80m and 160m to start to improve next winter and for several winters after that. Moreover, using the rule of thumb that the shorter the minimum the stronger the maximum, the green curve is suggesting the intensity of the peak of Cycle 25 could be comparable to that of Cycles 21 and 22. The pessimists in the crowd are predicting an even worse peak than Cycle 24 – possibly another Maunder minimum where the sun goes dormant for centuries. Based on the fact that science has yet to work out a physical model for the workings of the sun, all we can do at this stage is speculate (and work on building a better model).

And by the way, I don't know if you've read Dudik et. al.'s latest paper ("SLIPPING MAGNETIC RECONNECTION DURING AN X-CLASS SOLAR FLARE OBSERVED BY SDO/AIA", U. of Cambridge), but they have finally figured out the mechanism of solar flares and have successfully modeled them in 3 dimensions in the computer. This work was based on the July 2012 X-Ray flare, as observed by the SDO and STEREO satellites. They were able to capture this hour long event in more detail than ever before. The big breakthrough was in extending 2D models into 3D models and realizing that the process of slippage of surfaces (referred to as QSLs) and the reattachment of magnetic ribbons to these QSLs was responsible for the release of flares. The new generation of satellites and integration of these data are already paying dividends in our being able to model these physical processes. Perhaps we will have a working model of the sun in another 10 years or so.

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**Figure 1.**

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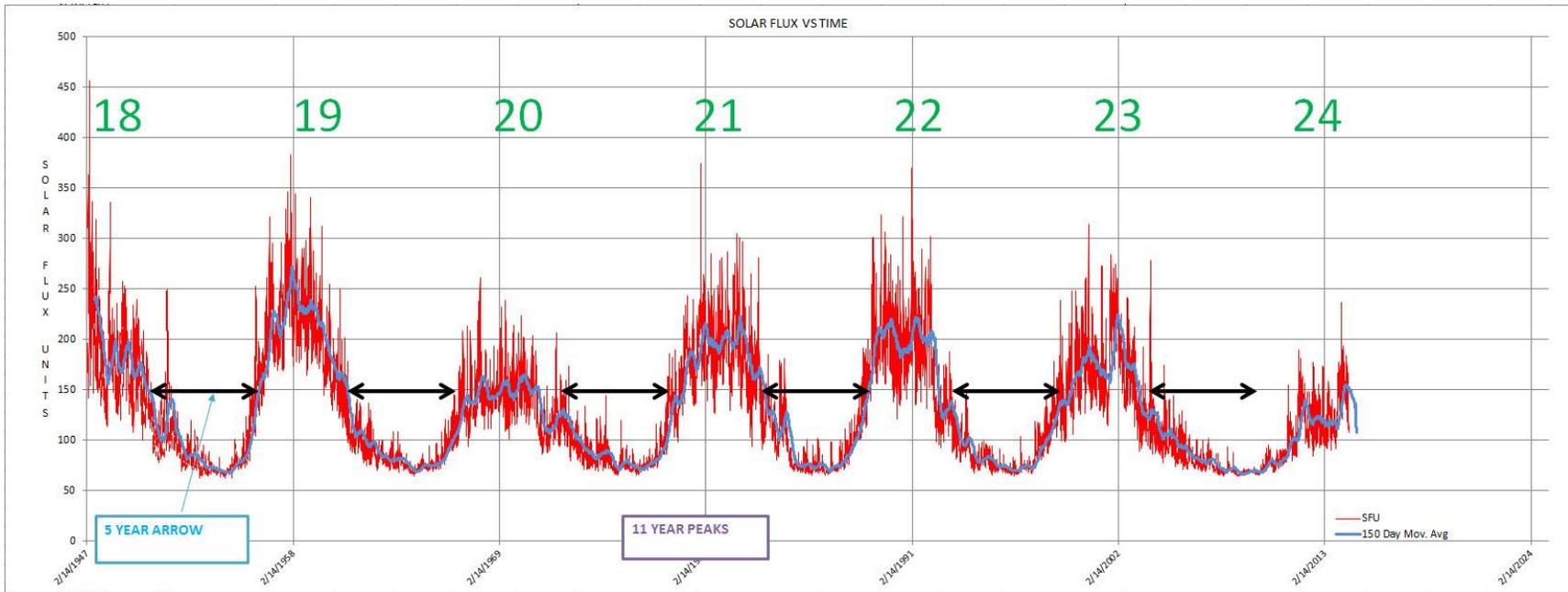


Figure 2.