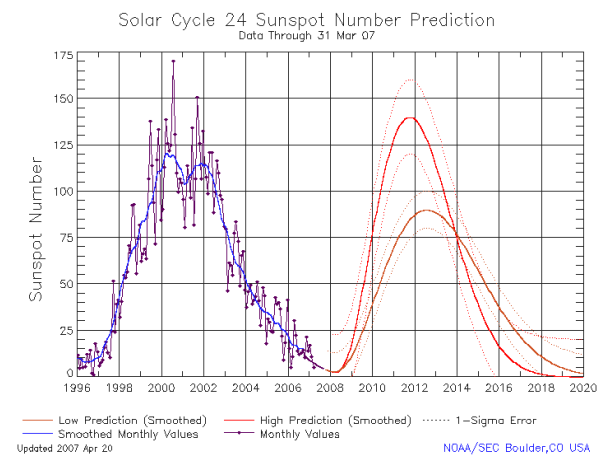


Introduction: The planets of our Solar System are inside the Heliosphere, interacting with the ever changing solar wind. Therefore it is important to predict the level of the next solar cycle. Although new cycle active regions were already observed on the Sun in January 2008, we are in the minimum of the solar cycle yet.

Predictions for the next, 24th solar cycle vary widely, even the NOAA forecast center issued an unprecedented two-valued forecast [1]:

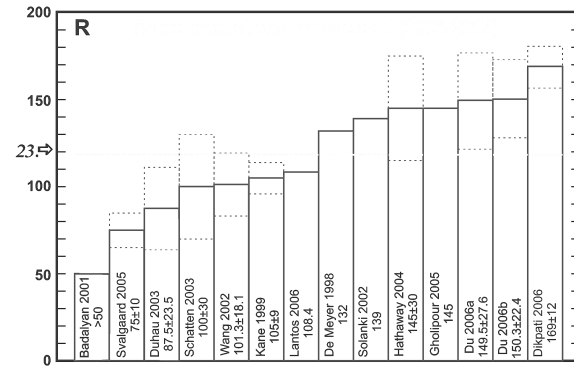


Forecast methods: As the solar activity cycle contains a significant random component beside the well-known 11 year cycle, the task is not easy. The cycle itself was revealed only about 1,5 centuries ago, so various methods emerged for the forecast (a subjective classification):

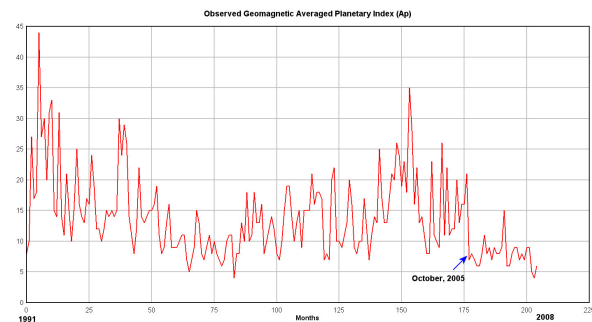
- 1.) *Deterministic time-series analysis:*
(Fourier-series, wavelet-analysis, other supposed or real periodicities, neural network, deterministic chaos)
- 2.) *Stochastic time-series analysis:* (ARMA models)
- 3.) *Egyptian method* (a.k.a. McNish-Lincoln [2]):
(Determine the future on the base of averaging the observations collected in past centuries)
- 4.) *Precursor method:* (Geomagnetic activity, measured around previous minimum, Ol' [3])
- 5.) *Physical method:* (Observational data inserted in computations of dynamo theory, Dikpati & al. [4])
- 6.) *Astrological method:* (On the base of the positions of planets, mainly Jupiter, thinking of tidal forces)

Forecast results: Several predictions were made for Cycle 24 based on various methods, these differ widely, as usual. Some researchers warn of very high possible sunspot numbers, others think that they will be

low. The average of these predictions comes very close to the height of the most recent 23th cycle:



Observed problems. Some observations indicate, that Cycle 24 will not be an ordinary one. The minimum now occurring is unusually long, and the geomagnetic activity, indicated by index A_p , underwent a sudden reduction in October, 2005 [5]:



So it will be really interesting to follow, which forecast will describe best the real solar activity, and whether will it be usual or extraordinary.

References:

- [1] <http://www.swpc.noaa.gov/SolarCycle/SC24/index.html>
- [2] McNish, A. G., Lincoln, J. V. (1949): *Trans. AGU* 30, 5.
- [3] Ol', A. I. (1966, 1976): *Solnechnye Dannye* 1966/12, 84, 1976/9, 73.
- [4] Dikpati, M., de Toma, G., & Gilman, P. A.: (2006) *Geophys. Res. Lett.* 33, L05102, *Astrophys. J.* 649, 498.
- [5] <http://wattsupwiththat.wordpress.com/2008/02/28/sun-blank-again/>

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