



A comparison between all the hourly automatic and manual scaled parameters from the Chilton ionosonde from 1996 to 2005

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Most ionosonde stations now rely on automatic scaling for obtaining regular ionospheric parameters. Despite the complexity of ionogram data, the previously common practice of having a skilled person check each ionogram and scale or correct the parameters manually is becoming a rarity. Automated processing has the practical advantages of speed and reduced cost, and it allows near real-time soundings to be made available on the web. But are these benefits obtained at the expense of accuracy?

The mid-latitude ionosonde at Chilton (51.5 N, -1.30 E) in the UK is a UMASS Lowell Digital Portable Sounder for which the hardware and software have been actively maintained. It is also one of the few for which the practice of regular manual scaling has continued, with consistency ensured by the use of a single scaler for the period covered by this investigation. This makes Chilton an ideal station for investigating the performance of automatic scaling algorithms, specifically the ARTIST 4.0 to 4.5 versions software supplied by Lowell with the sounder. The study reported here examines many of the regularly sounded parameters (foF2, h'F2, foE, h'E, MUF3000F2, foF1, h'F1, fmin), for the period from 1996 to the start of 2005. This covers sunspot minimum, maximum, storms and quiet periods, and changes in ionosonde equipment and software.

It is generally suspected that auto-scaled values will be less accurate during storm periods. An examination of how the difference between manual and auto-scaled values varies with the global storm index, Dst, has shown that this is only weakly true. Rather, it appears that interference from local noise or broadcast stations, causing gaps in the auto-scaled traces, has a far more significant effect on the errors than Dst. Examina-

tion of the distribution of errors by time reveals clear diurnal and seasonal variations in the size of the errors. This study has come about as a result of the European Community COST 271 Action and the creation of the COST 271 Space Weather Ionospheric Database (http://www.wdc.rl.ac.uk/cgi-bin/digisondes/cost_database.pl).