Using *DECLINATION in Survex files

BACKGROUND

- We survey to magnetic north (using compass or DistoX).
- NOAA (https://www.ngdc.noaa.gov/geomag/calculators/magcalc.shtml#declination) is used to find the declination (difference between Magnetic North (Nm) and True North (Nt)) at the centre of the Matienzo depression. This value is re-visited 2 or 3 times each year and used across the permit area(s)
- The NOAA model is revised every 5 years (Survex manual 1.2.44 p28)
- NOAA web page states: "Declination results are typically accurate to 30 minutes of arc" (0.5deg)
- Matienzo maps and surveys use Grid North (Ng) which was calculated as 0.4deg west of Nt. That is, if NOAA gave 0.9 for the declination, Ng at Matienzo would be 0.9-0.4=0.5deg
- The svx file would include *CALIBRATE DECLINATION 0.5 to bring all bearing in line with Ng.
- The above works with paper maps, Spanish online maps (if they're not ED50) and the QGIS system which is set to use the WGS84 / ETRS89 coordinate system.

NEW METHOD

Survex (v1.2.44) is now recommending that cavers use

*BEGIN cave *CS UTM30N *CS OUT UTM30N *DATE yyyy.mm.dd *DECLINATION auto x y z *FIX 0 x y z

where "*DECLINATION auto x y z" automatically applies the correction required to convert Nm to Ng in the x, y, z area using the UTM, sheet 30, coordinate system on the specified date.

If bearings are read in a device with software that converts to Ng then another correction must not be carried out! Also care must be taken with *INCLUDEing other batches which may have their own *CALIBRATE DECLINATION or *DECLINATION auto x y z. Overall it is probably best to work exclusively with magnetic readings then apply the correction afterwards in Survex. This would also remove the problems of multiple batches in a surveying device; but not importing back corrected batches??

(Footnotes:

4 - This method can also be used on past (reconstructed) surveys as the IGRF model in NOAA (used by Survex) goes back to 1590.)

5 - A version of Survex later than 1.2.43 must used.

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^{1 -} I believe that the automatic correction is now built into Survex and an Internet connection to NOAA is not required. This might have been an issue in the Matienzo Office.

^{2 -} A quick check of "*CALIBRATE DECLINATION" compared with "*DECLINATION auto x y z" found a difference of a couple of metres over 2km, reducing to 0m difference if the difference between Ng and Nt is adjusted from 0.4deg to 0.44deg. (The previous difference was rounded down)

^{3 -} There seems to be no reason why we shouldn't adopt the new method for future surveys and insert these 6 lines at the start of each svx file and/or batch.