

Calculation of declination

Instructions for „The Earth Magnetic Field – worksheet”

Example 1

The following information on geomagnetic declination is available from a map:

5°10' E 2000 (8' E). Determine the declination for the current year (2017).

Solution

Interpretation of the available information

The declination value in 2000 was 5°10' E (East). The annual change is 8' E, i.e., an increase by eight angular minutes during one year.

Formula:

$$\text{declination}(2017) = \text{declination}(2000) + \text{how_many_years} * \text{annual_change}$$

Calculation:

How many years have passed: $2017 - 2000 = 17$

What is the change of declination during that time: $17 * 8' = 136' \text{ E}$

Converting angular minutes to degrees: $136' \text{ E} = 2^{\circ}16' \text{ E}$

Applying the formula: $\text{declination}(2017) = 5^{\circ}10' \text{ E} + 2^{\circ}16' \text{ E} = 7^{\circ}26' \text{ E}$

Example 2

The situation and task are the same as in the example above. The available information is 1°30' W 1994 (+0.1°).

Solution

Interpretation of the available information

The declination value in 1994 was -1°30' W (West is expressed by a negative sign). The annual change is = +0.1° E.

Formula:

$$\text{declination}(2017) = \text{declination}(1994) + \text{how_many_years} * \text{annual_change}$$

Calculation:

How many years have passed: $2017 - 1994 = 23$

What is the change of declination during that time: $23 * 0.1^{\circ} \text{ E} = 2.3^{\circ} \text{ E} = 2^{\circ}18' \text{ E}$

Declination(2017) = -1°30' W + 2°18' E = 0°48' E