

Polar Field Fitting

$$B_r^f(\theta, \phi) = \sum_{m=0}^M [s_m(\theta)\sin(m\phi) + c_m(\theta)\cos(m\phi)]$$

$s_m(\theta)$ and $c_m(\theta)$ are given functions that depend on m :

e.g.,

$$c_0(\theta) = a + b\theta^2$$
$$c_1(\theta) = c\theta + d\theta^3$$

Determine coefficients ($a, b, c, d \dots$) of s_m and c_m from a least-squares fit:

$$\min \varepsilon = \sum_i (B_r^f(\mathbf{x}_i) - B_{ri})^2$$

Typical parameters:

Fit up to $M = 5$

Fit in range:

$$14^\circ \leq \theta \leq 26^\circ$$

Replace data in range:

$$0 \leq \theta \leq 20^\circ$$