Inversión de datos aeromagnéticos para la generación de modelos 3D de magnetización

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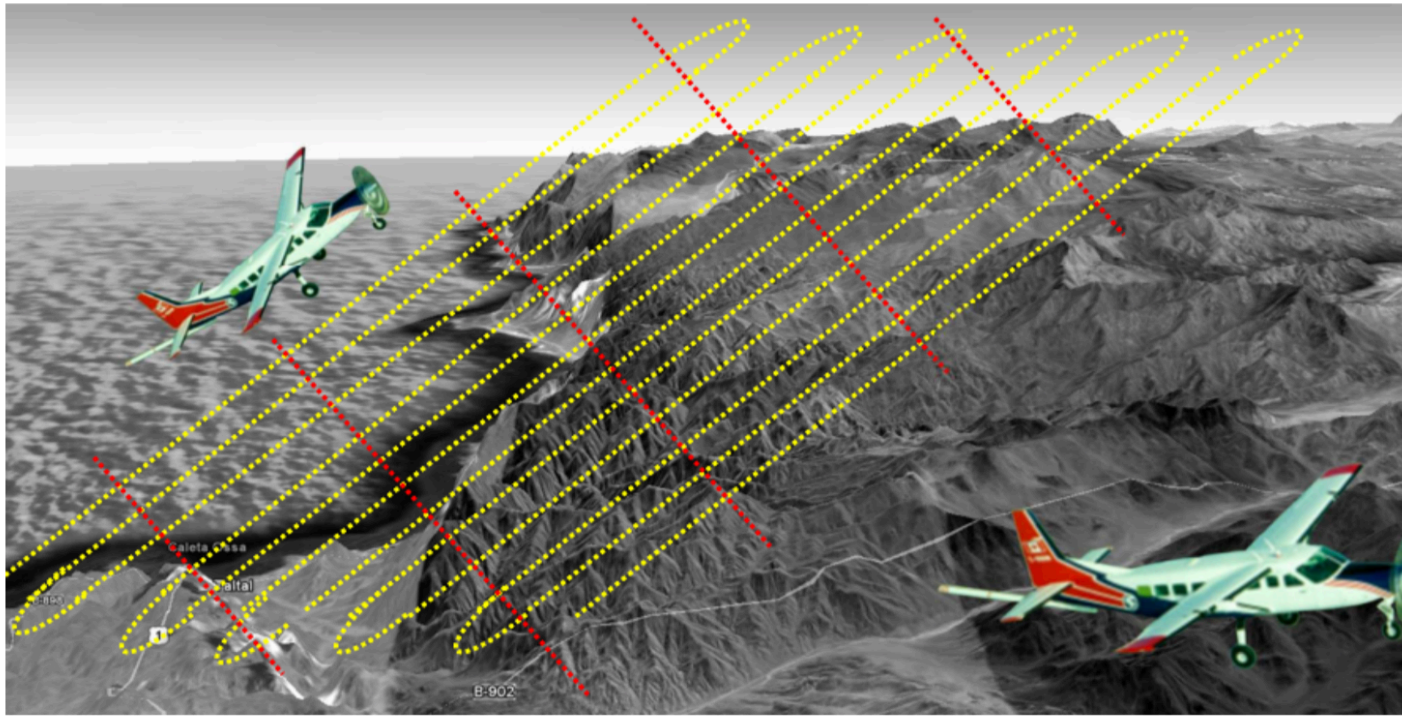
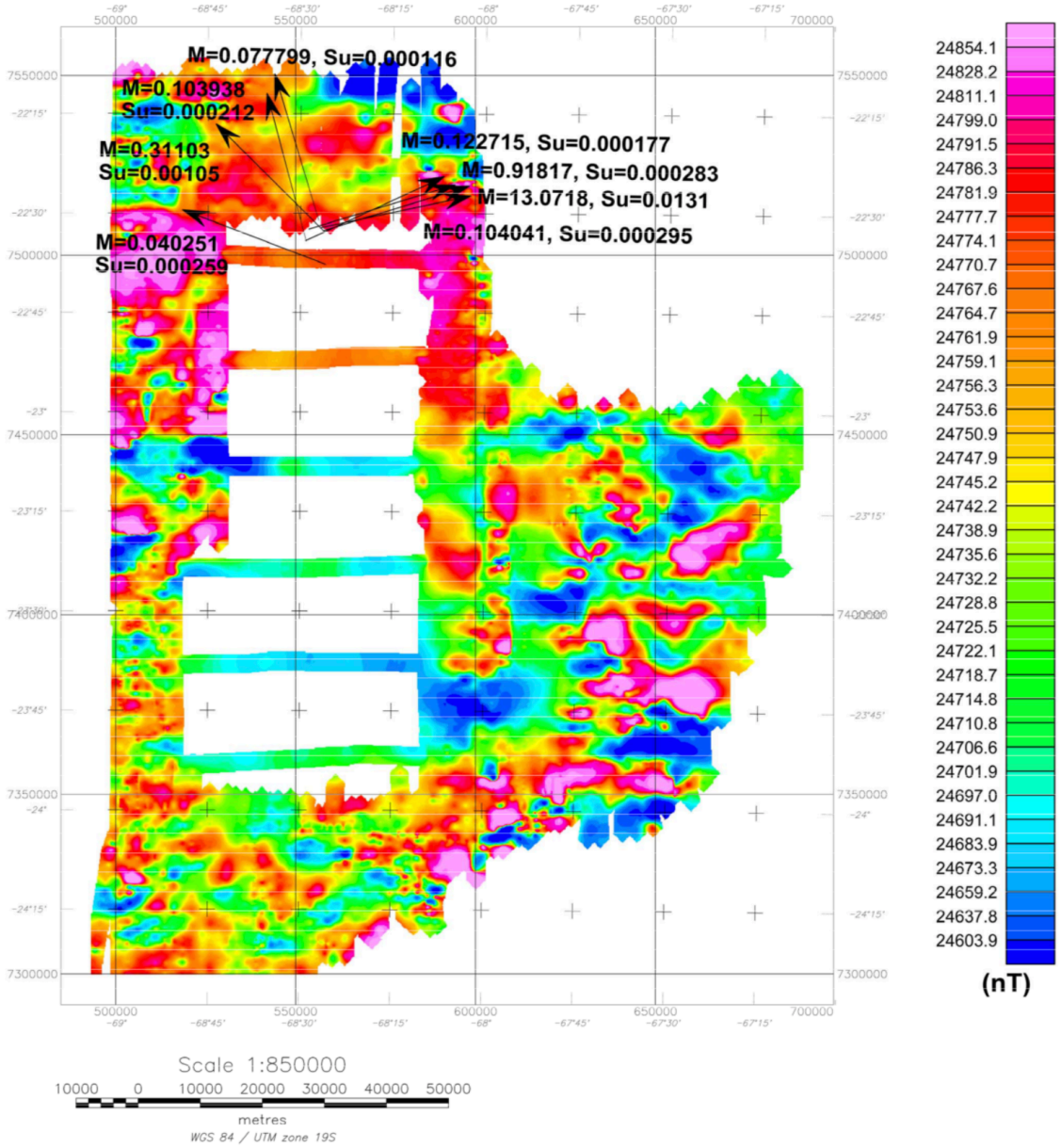
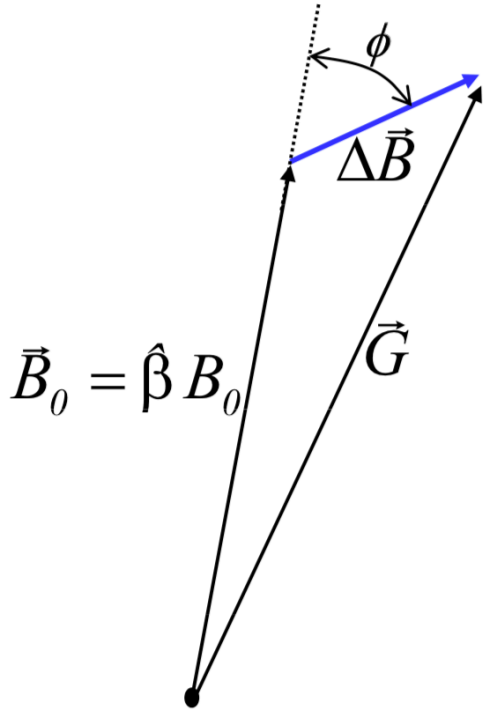
Aeromagnetic Survey



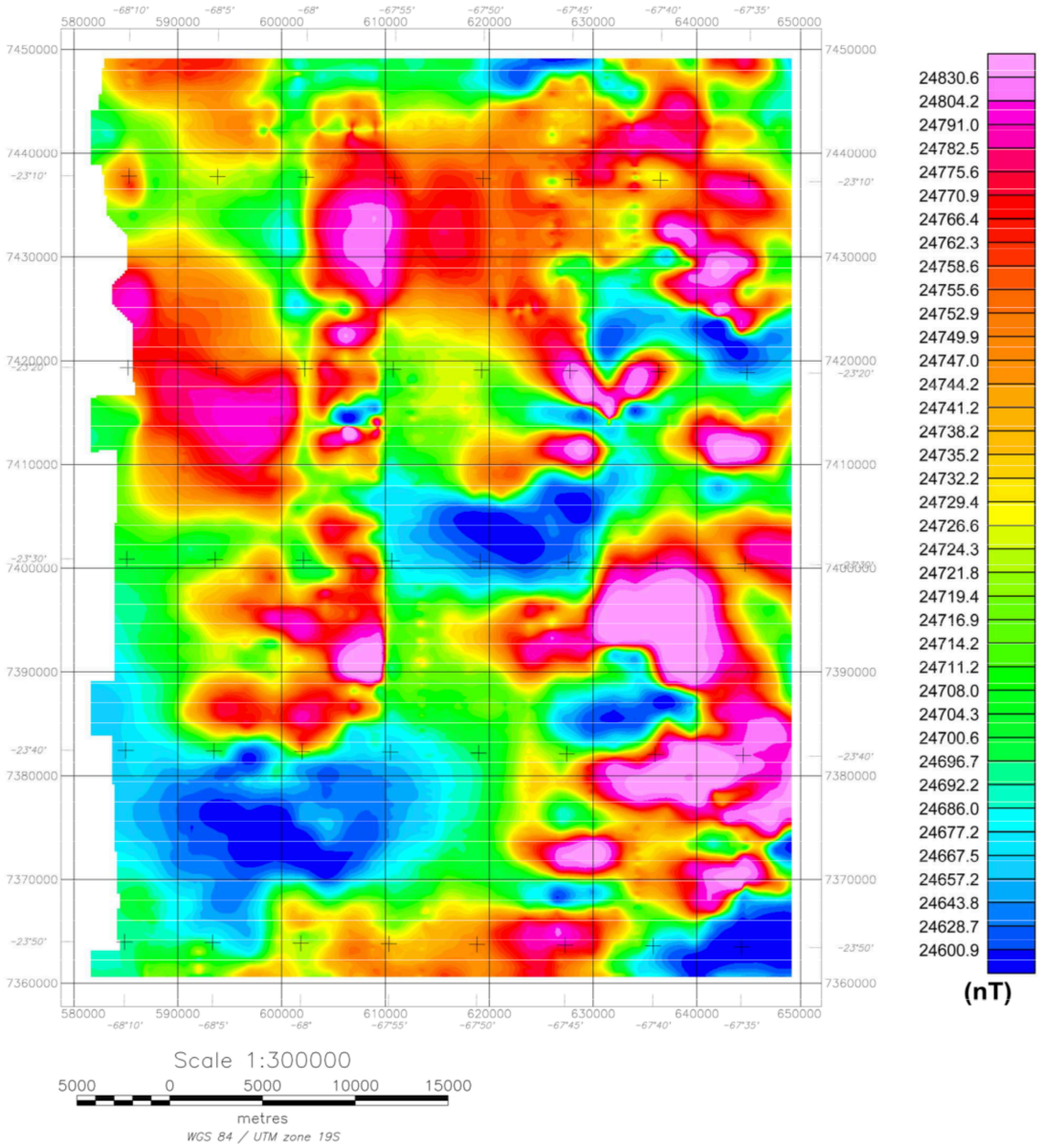
Aeromagnetic Survey Squeme (SERNAGEOMIN 2014)



Magnetic Anomaly



$$A_T \approx \left|\vec{B_o}\right| + \left|\Delta\vec{B}\right| cos(\phi) - \left|\vec{B_o}\right| = \left|\Delta\vec{B}\right| cos(\phi) = \hat{\beta}\Delta\vec{B}$$



Linear Problem

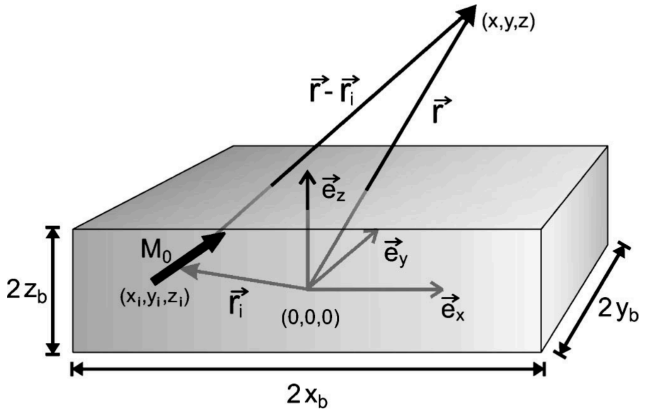


FIG. 1. Illustration of the integration geometry of the bar magnet. The magnetization M is along the y axis, the dimensions of the magnetized volume are $2x_b, 2y_b$, and $2z_b$.

$$H_x(x,y,z) = \frac{M_0}{4\pi}\sum_{k,l,m=1}^{2}(-1)^{k+l+m}\ln\left\{z+(-1)^m z_b+\sqrt{\left[x+(-1)^k x_b\right]^2+\left[y+(-1)^l y_b\right]^2+\left[z+(-1)^m z_b\right]^2}\right\},$$

$$H_y(x,y,z) = -\frac{M_0}{4\pi}\sum_{k,l,m=1}^{2}(-1)^{k+l+m}\frac{\left[y+(-1)^l y_b\right]\left[x+(-1)^k x_b\right]}{\left|y+(-1)^l y_b\right|\left|x+(-1)^k x_b\right|}$$
$$\times\arctan\left\{\frac{\left|x+(-1)^k x_b\right|\cdot\left[z+(-1)^m z_b\right]}{\left|y+(-1)^l y_b\right|\cdot\sqrt{\left[x+(-1)^k x_b\right]^2+\left[y+(-1)^l y_b\right]^2+\left[z+(-1)^m z_b\right]^2}}\right\},$$

$$H_z(x,y,z) = \frac{M_0}{4\pi}\sum_{k,l,m=1}^{2}(-1)^{k+l+m}\ln\left\{x+(-1)^k x_b+\sqrt{\left[x+(-1)^k x_b\right]^2+\left[y+(-1)^l y_b\right]^2+\left[z+(-1)^m z_b\right]^2}\right\}$$

R. Engel-Herbert and T. Hesjedal (2005)

$G * m = d$ and more….

$$\vec{M} = \vec{M}_I + \vec{M}_R = \chi\frac{B_o}{\mu_o}\hat{\beta} + M_R\hat{\gamma}$$