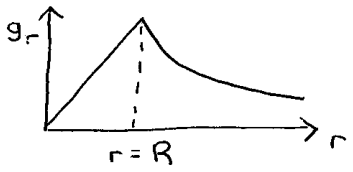
FINAL EXAM - GEOPHYSICS 325 - 2004

SOLUTION

(a) $g_r = \dfrac{4\pi R^3 \rho G}{3r^2}$ (use Gauss's theorem)

(b) $g_r = \dfrac{4\pi G \rho r}{3}$ (use Gauss's theorem)



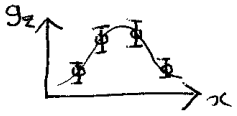
(c) see notes; use base station and drift curves

(d) ⇒ topography is not usually a slab
⇒ density unknown & variable

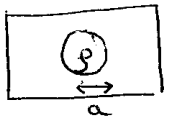
(e) ① Errors in data : solution = more / better data

② Inherent physics : no solution

Example of ①



error in $x_{1/2}$ → error in depth



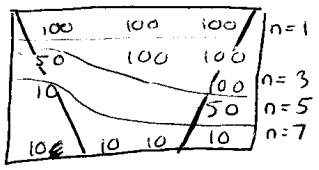
Example of ②

g_z^{max} → many combinations of density (ρ) and radius (a)

2(a) see notes

(b) see notes

(c)



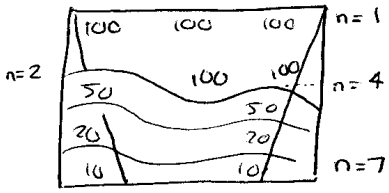
ρ_a = 100 Ωm at n=1

ρ_a decreases at n=2 on left

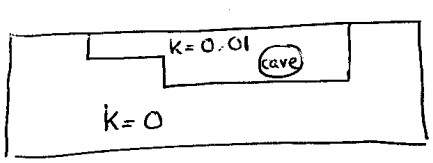
ρ_a decreases at n=5 on right

ρ_a = 10 at n=7, everywhere

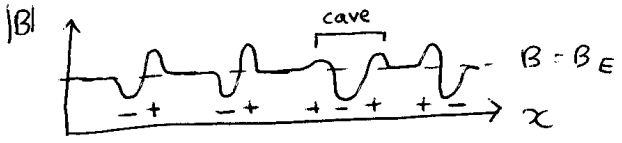
triangle shape of pseudosection

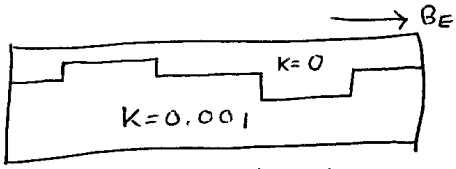


3(a)

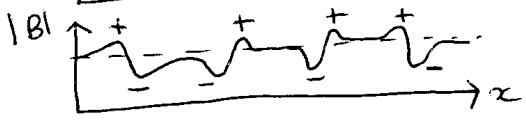


B_E ⇐ at North Pole





⇐ at Equator



At aircraft elevation

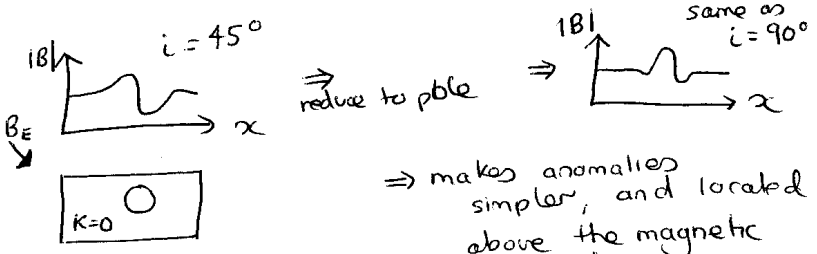
⇒ longer wavelength

⇒ smaller anomaly

3(b) Thermo remnant magnetization
Detrital remnant magnetization
chemical remnant magnetization

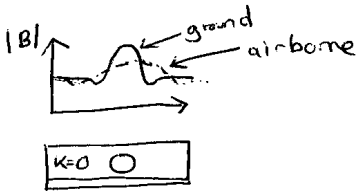
3(c) Proton precession magnetometer ⇒ see notes

3(d) REDUCTION TO POLE



⇒ makes anomalies simpler, and located above the magnetic object

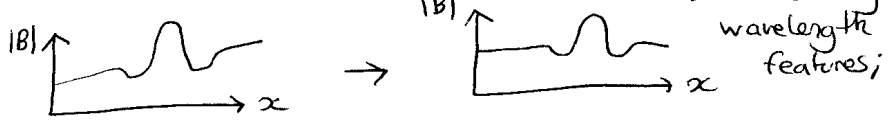
UPWARD CONTINUATION



⇒ allows ground and aeromagnetic data to be combined

⇒ also used to filter data

TREND REMOVAL



⇒ remove long wavelength features;