

Validation des solutions

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VALIDATION DES SOLUTIONS

Validations internes (principalement pour la partie champ de gravité)

- Spectres (de puissance, de variance, d'écart à une référence), spectres cumulés

- Exploitation de la matrice de covariance :
 - Tracé des triangles de variance, de corrélation entre les paramètres
 - Projection de la matrice de covariance sous forme de cartes représentant les erreurs du géoïde, des anomalies de gravité, des déviations de la verticale E-W et N-S...
 - Projection de la matrice de covariance sous forme de prédiction de l'erreur radiale d'orbite :
 - A une altitude donnée : en fonction de l'inclinaison du satellite
 - Pour un satellite donné (altitude et inclinaison fixées) : cartes des erreurs géographiquement et non-géographiquement corrélées, cartes des erreurs sur les traces ascendantes et descendantes

Validations externes

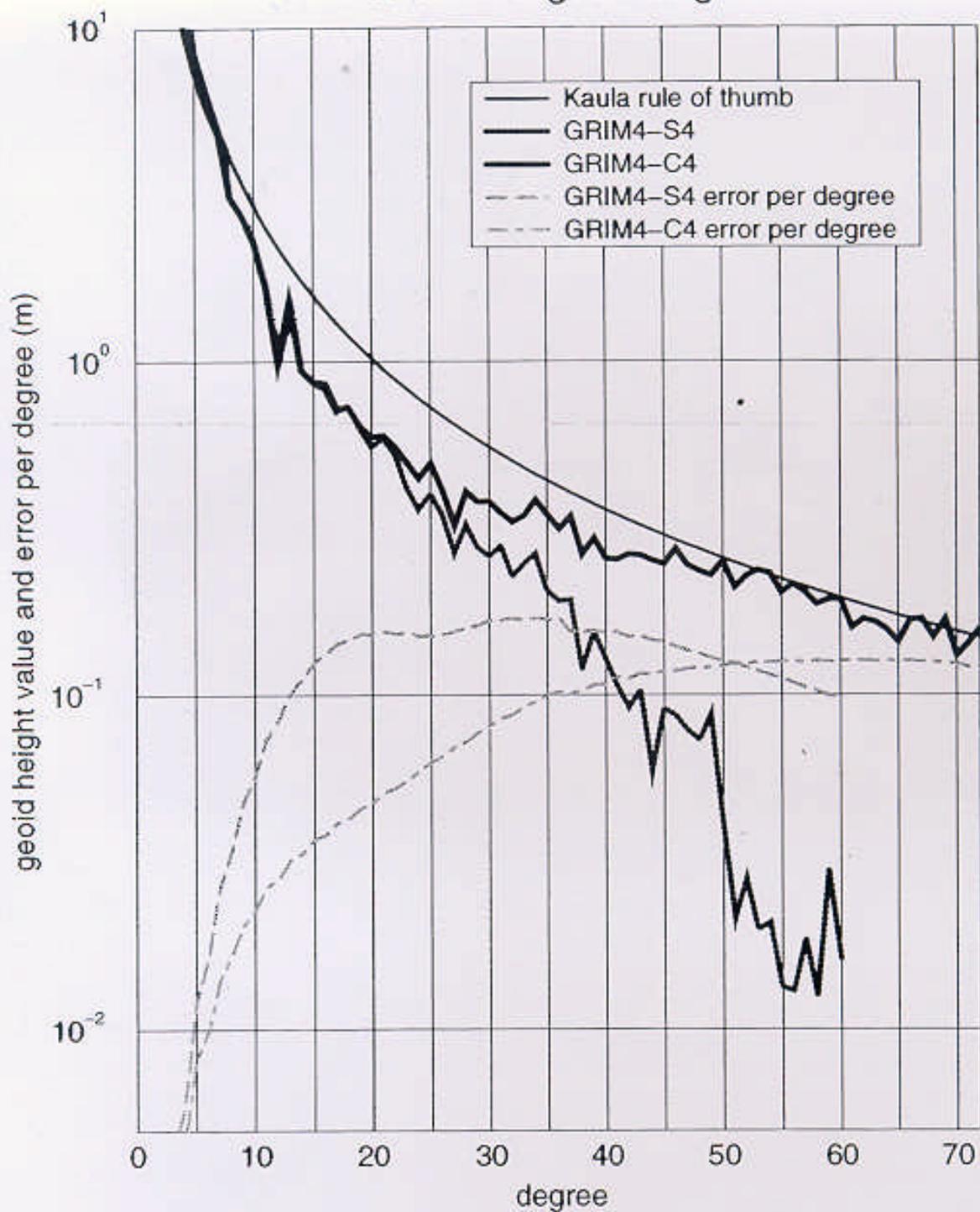
- Champ de gravité :
 - Comparaisons de grilles : anomalies de gravité, géoïde (Mean Sea Surface – Dynamic Topography)
 - Comparaison de points : hauteurs géoidales obtenues par « GPS Levelling »
 - Variations temporelles du J2, J3...

- Marées : Comparaison à des modèles hydrodynamiques

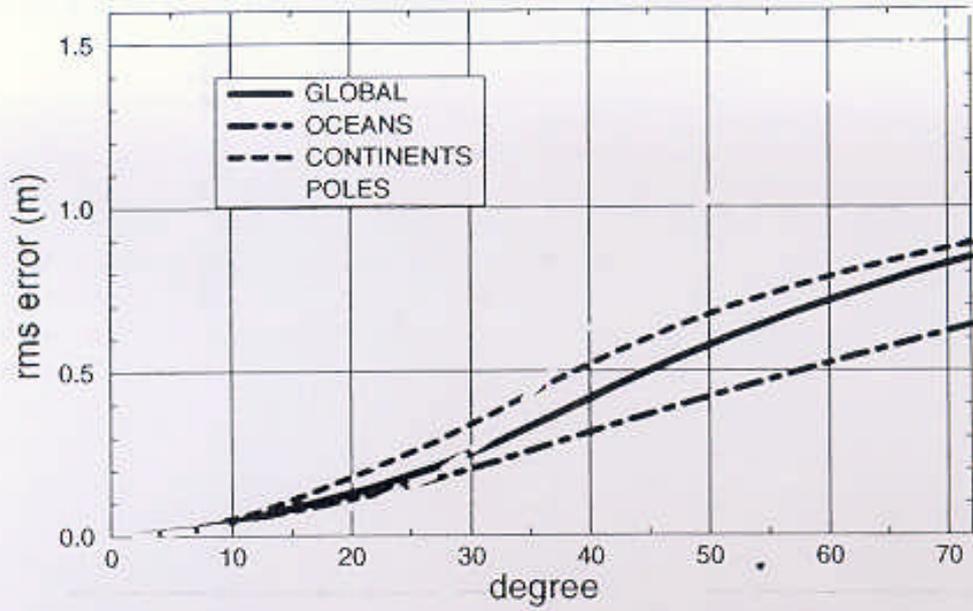
- Stations : Comparaison à l'ITRF

- Géocentre

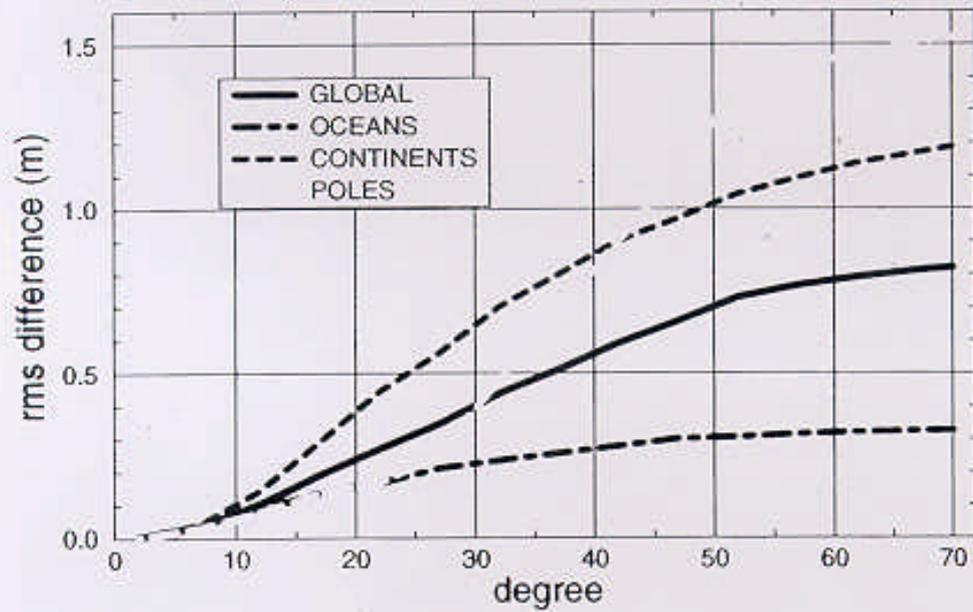
Signal/Error per degree for GRIM4-S4/-C4 in terms of geoid height



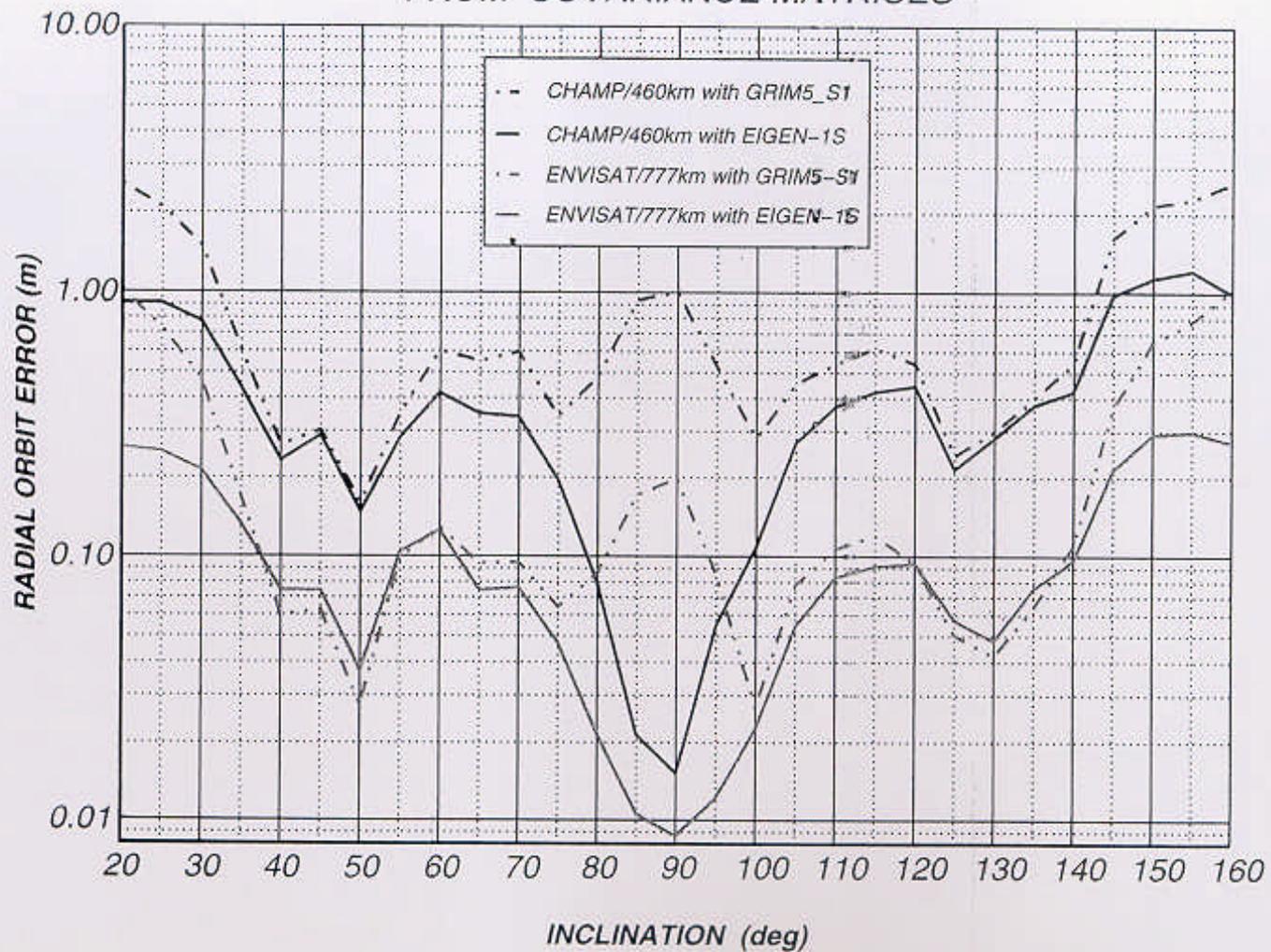
GRIM4-C4 CUMULATED GEOID ERROR

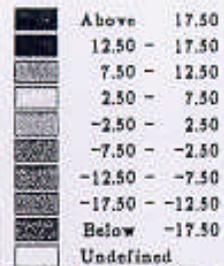


GRIM4-C4 / JGM3 CUMULATED GEOID DIFFERENCE

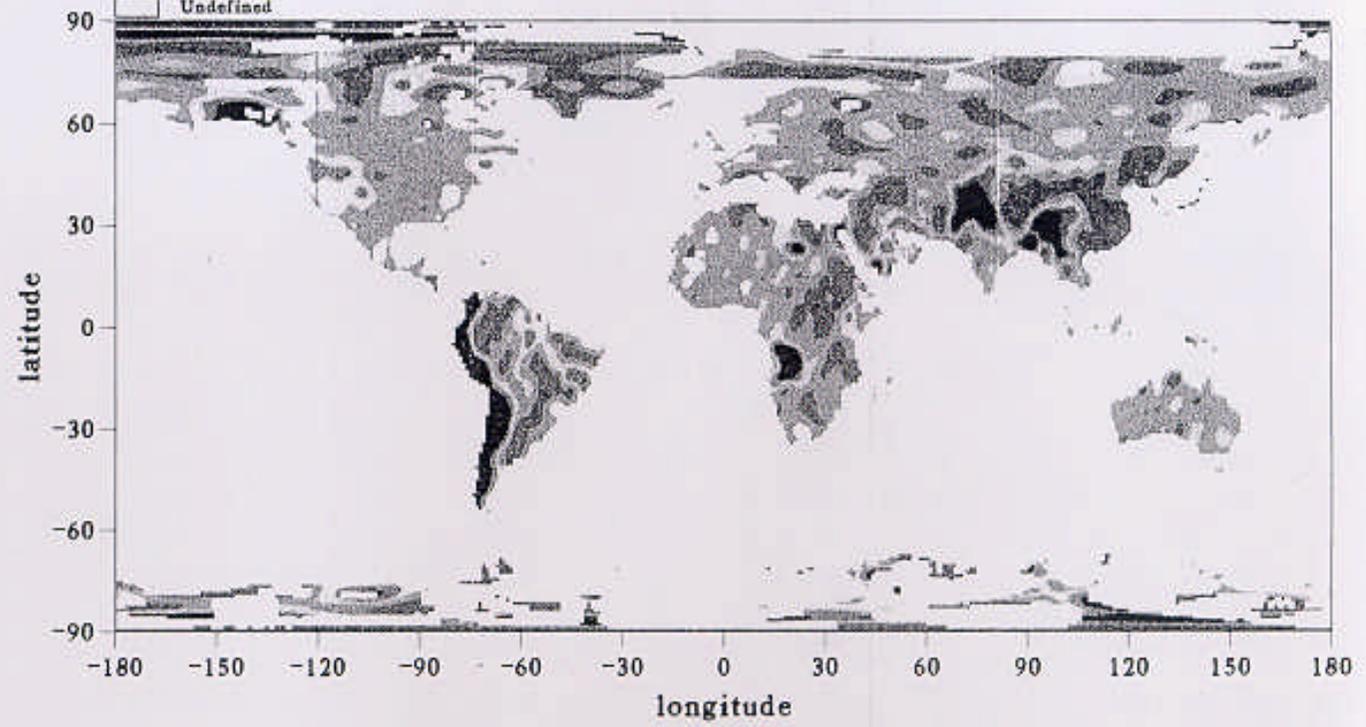


EXPECTED RADIAL ORBIT ERROR AS A FUNCTION OF INCLINATION
FROM COVARIANCE MATRICES





GRAVITY ANOMALIES DIFFERENCES :
 GRIM4-C4 minus Filtered Gravimetric Data
 (mgal - deg max = 72)
 r.m.s. = 7.7 mgal / max = 85. mgal



4.2 Results for Australia and New Zealand (ANZ)

Table 2 shows the descriptive statistics of the fit of the various GGMs to the ANZ point free-air gravity anomalies on land. Table 3 shows the fit to the ANZ GPS-levelling data (recall that New Zealand uses 12 separate vertical datums). Tables 4 and 5 show the fit of the Pizzetti deflections from the GGMs to the ANZ (Helmert) deflections.

model	degree	Australia (768,992 points)				New Zealand (41,060 points)			
		max	min	mean	std	max	min	mean	std
raw data		248.590	-112.321	2.236	25.112	201.910	-158.720	20.503	42.420
JGM-3	70	220.073	-100.940	-0.641	20.975	192.240	-147.336	1.753	38.696
EGM96S	70	230.386	-99.918	-0.314	22.544	193.240	-171.144	2.593	40.147
GRIM5-S1	99	226.757	-104.719	-0.161	21.932	190.350	-161.581	6.434	40.606
EIGEN-1S	100	220.658	-108.232	-0.328	21.623	187.032	-157.078	4.284	40.436
GRIM5-C1	120	202.758	-94.333	-1.467	18.429	206.591	-135.931	-5.520	37.908
TEG-4	200	211.887	-97.740	-1.749	15.270	189.463	-102.125	-8.366	30.758
GFZ97	359	216.479	-95.959	-0.367	11.103	171.125	-110.699	-5.433	27.313
EGM96	360	220.046	-95.110	-0.722	11.097	162.188	-113.305	-8.431	27.978
EGM96COR	360	220.046	-95.110	-0.722	11.097	162.188	-113.305	-8.431	27.978
PGM2000A	360	219.517	-95.154	-0.675	11.085	162.073	-113.927	-8.744	27.978
GPM98C	1800	204.165	-96.957	-1.432	14.093	239.014	-122.875	-10.825	30.450

Table 2. Fit of the geopotential models to land gravity observations [mGal]

model	degree	Australia (1,013 points)				New Zealand (1,055 points)			
		max	min	mean	std	max	min	mean	std
raw data		71.301	-3.880	11.298	23.106	3.583	39.410	16.235	10.817
JGM-3	70	4.024	-3.838	-0.018	1.156	3.661	-5.350	0.740	1.691
EGM96S	70	5.674	-4.563	0.630	1.665	4.520	-8.392	0.936	2.848
GRIM5-S1	99	6.527	-4.006	-0.190	1.660	4.558	-7.210	1.254	2.695
EIGEN-1S	100	6.251	-4.114	0.046	1.487	4.462	-6.616	0.940	2.265
GRIM5-C1	120	3.492	-2.259	-0.145	0.718	3.248	-4.707	0.000	1.191
TEG-4	200	3.053	-2.543	-0.105	0.499	3.373	-2.397	0.002	0.694
GFZ97	359	3.750	-2.584	-0.052	0.497	4.636	-0.963	0.303	0.697
EGM96	360	3.537	-2.441	-0.015	0.441	3.712	-1.338	0.027	0.616
EGM96COR	360	3.538	-2.442	-0.005	0.434	3.734	-1.332	0.035	0.620
PGM2000A	360	3.466	-2.312	-0.012	0.439	3.660	-1.388	-0.022	0.611
GPM98C	1800	3.351	-2.459	-0.003	0.491	3.325	-2.152	-0.028	0.675

Table 3. Fit of the geopotential models to GPS-levelling data [m]

from Anas & Featherstone, Geomatics Research Australasia, 2002

Geocenter movement (annual + semi-annual)

computed from all GRIM5 data

