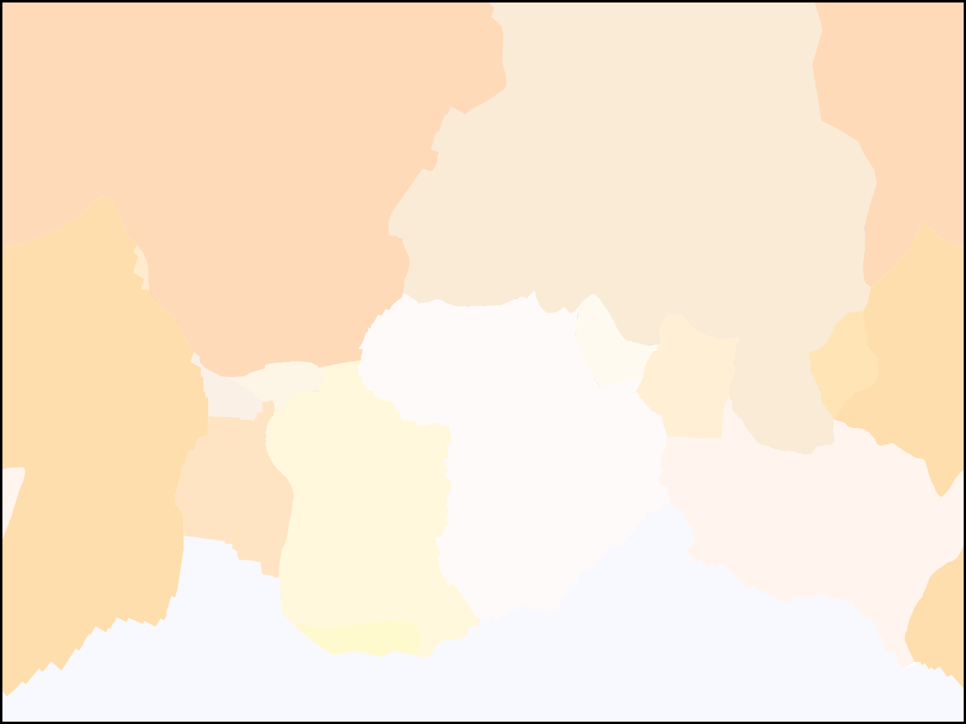
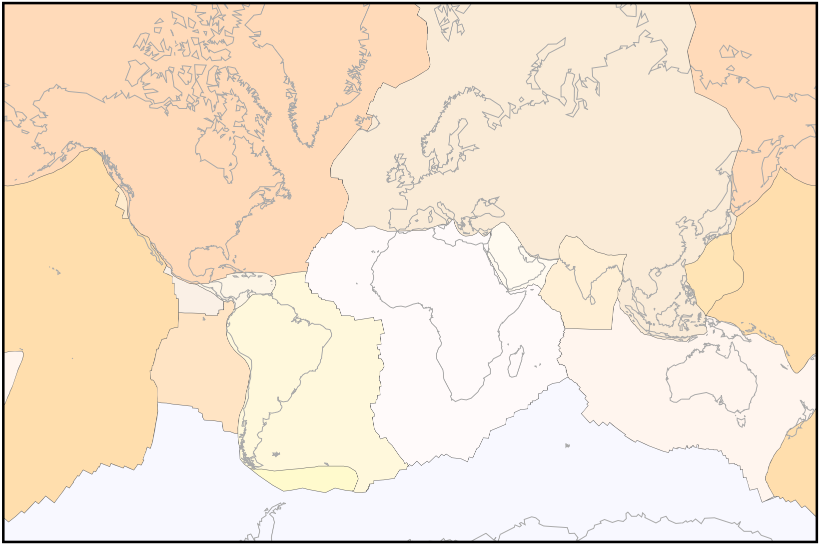
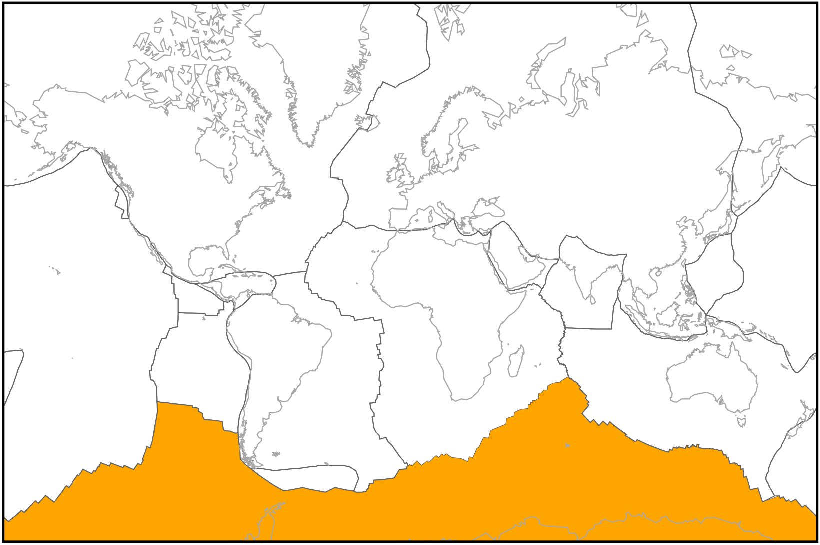




podział na płyty kontynentalne wg modelu NUVEL

afrykańska



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australijska

karaibska

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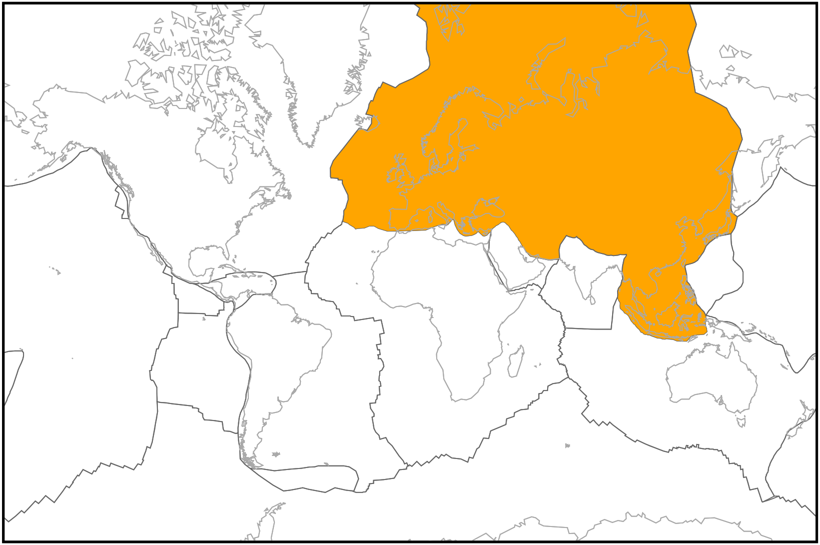

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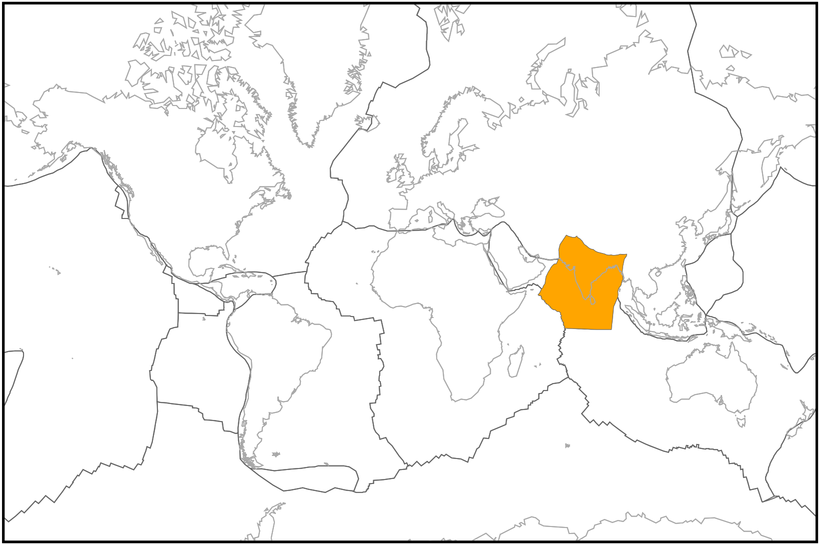
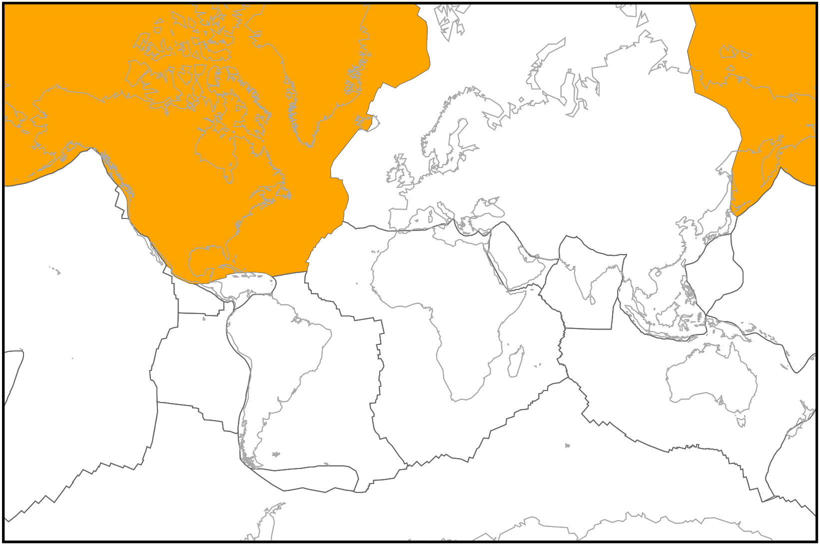


indyjska

Juan de Fuca

Nazca



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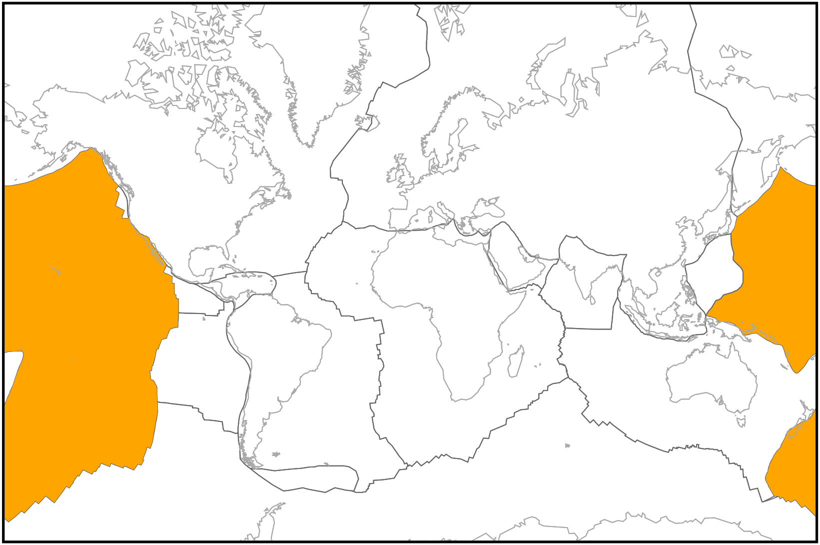

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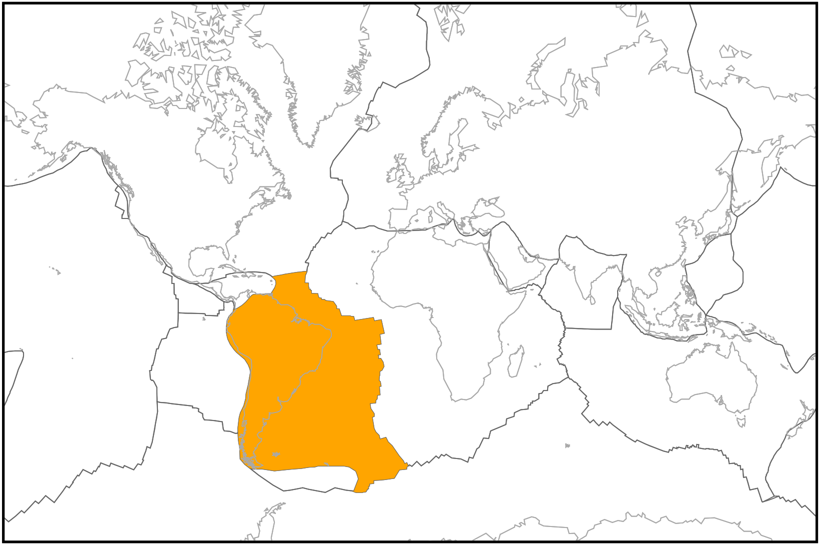

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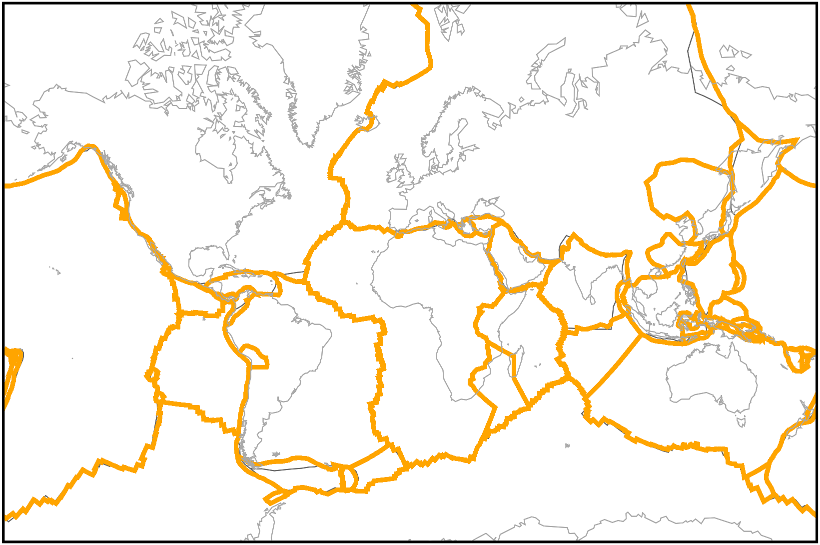
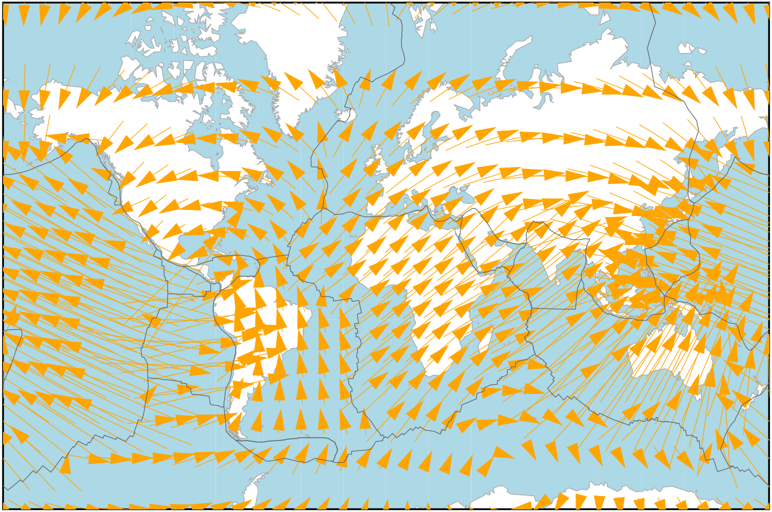


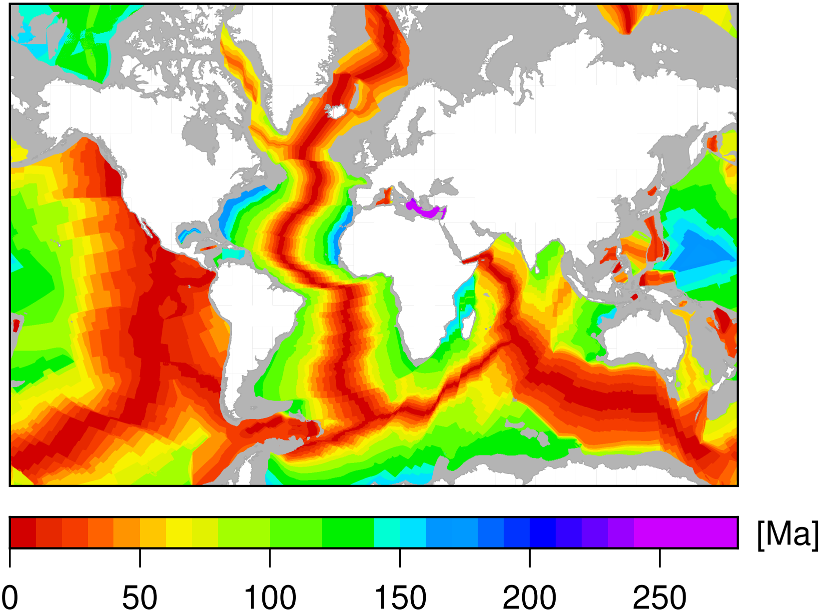
podział na płyty kontynentalne wg modelu MORVEL

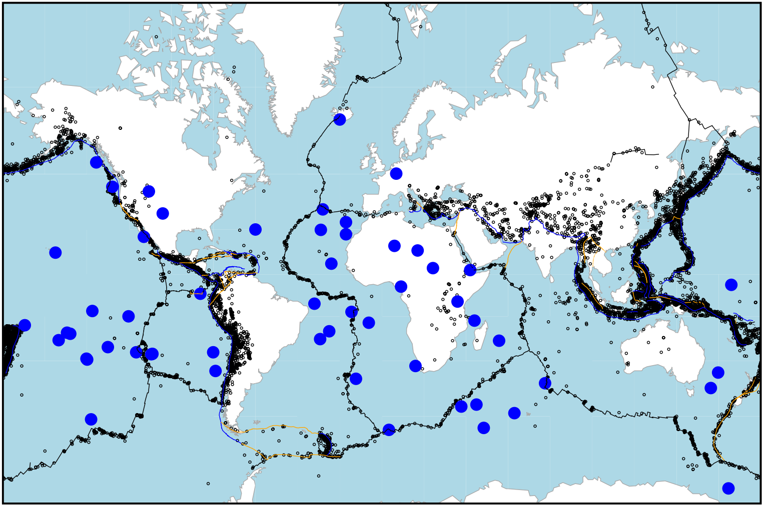
Rysunek: `http://www.ucmp.berkeley.edu/history/???????.html`

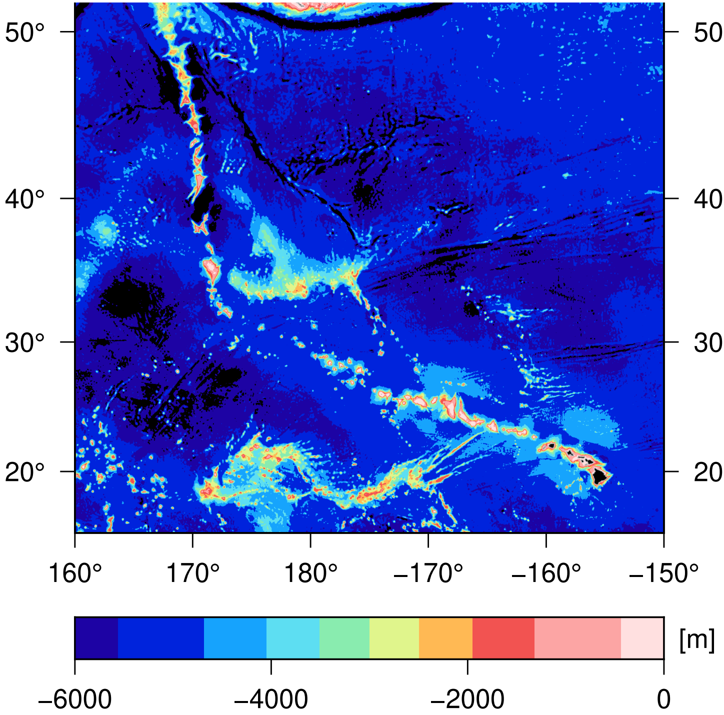


Skąd znamy te prędkości?

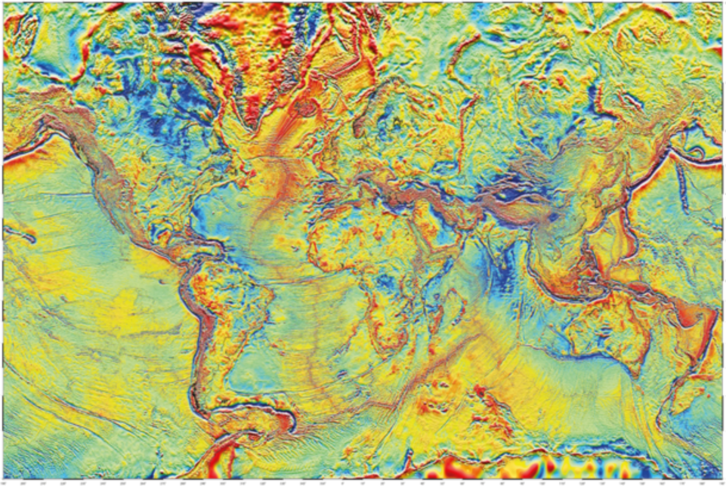
Wiek dna

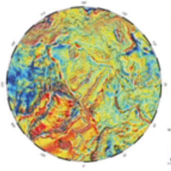






50°
40°
30°
20°
160°
170°
180°
−170°
−160°
−150°
−6000
−4000
−2000
0
[m]





Commission for the Geological Map of the World (CGMW) / Commission de la Carte Géologique du Monde (CCGM)

WORLD GRAVITY MAP / *CARTE GRAVIMETRIQUE MONDIALE*

(3) Free-air anomaly on the Earth's surface / *Anomalie à l'air libre sur la surface terrestre*

(First edition – 2012)

Authors

Bureau Gravimétrique International (BGI)

Supporting organizations

Centre National d'Etudes Spatiales (CNES) – Institut de Recherche pour le Développement (IRD)

Institut National des Sciences de l'Univers (INSU) – Institut National de l'Information Géographique et Forestière (IGN)

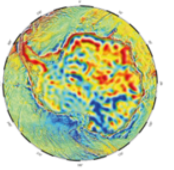
International Association of Geodesy (IAG) – International Gravity Field Service (IGFS) – United Nations Educational, Scientific and Cultural Organization (UNESCO)

Collaborating organizations

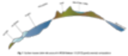
Curtin University (Australia) – National Geospatial-Intelligence Agency (NGA) – Technical University of Denmark (DTU)

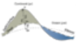
External review

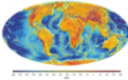
Internal review (CGMW)



World Gravity Map







Jak opisać ruch płyty?

Jak opisać ruch płyty?

Twierdzenie Eulera

położenie bieguna Eulera (Φ, Λ)

prędkość kątowa (Ω)

(kąt przeciwnie do ruchu wskazówek zegara)

Table S4. NNR-MORVEL56 angular velocities and full covariance matrix

NNR-MORVEL56 Angular Velocities
(no-net-rotation frame fixed)

Ab	Lat deg N	Lon deg E	Omega deg/Ma
pa	-63.5756	114.6975	0.6509
am	63.1704	-122.8242	0.2973
an	65.4235	-118.1053	0.2500
ar	48.8807	-8.4909	0.5588
au	33.8612	37.9414	0.6316
ca	35.1956	-92.6236	0.2862
co	26.9346	-124.3074	1.1978
cp	44.4352	23.0880	0.6080
eu	48.8509	-106.5007	0.2227
in	50.3722	-3.2898	0.5438
jf	-38.3086	60.0379	0.9513
lw	51.8860	-69.5195	0.2856
na	-4.8548	-80.6447	0.2087
nb	47.6763	-68.4377	0.2921
mq	49.1891	11.0524	1.1440
nz	46.2348	-101.0564	0.6957
ps	-46.0242	-31.3615	0.9098
ri	20.2450	-107.2861	4.5359
sa	-22.6179	-112.8327	0.1090
sc	22.5244	-106.1485	0.1464
sm	49.9506	-84.5154	0.3393
sr	-32.4957	-111.3224	0.1072
su	50.0558	-95.0218	0.3368
sw	-29.9420	-36.8671	1.3616
yz	63.0285	-116.6180	0.3335
SL	50.7058	-143.4675	0.2677
BH	-39.9983	100.4994	0.7988

```
   MO     14.2480     92.6656      0.7742
   SS     -2.8685    130.6236      1.7029
   WL      0.1050    128.5186      1.7444
   CR   -20.3985    170.5303      3.9232
   FT   -16.3322    178.0679      5.1006
   KE    39.9929      6.4584      2.3474
   NI     -3.2883  -174.4882      3.3136
   TO    25.8737      4.4767      8.9417
   PM    31.3510  -113.9038      0.3171
   AS    19.4251    122.8665      0.1239
   AT    40.1121     26.6585      1.2105
   GP      2.5287     81.1806      5.4868
   EA    24.9729     67.5269     11.3343
   JZ    34.2507     70.7429     22.3676
   OK    30.3022    -92.2813      0.2290
   NB   -45.0406    127.6370      0.8563
   SB      6.8767    -31.8883      8.1107
   MN     -3.6699    150.2676     51.5690
   NH      0.5684     -6.6018      2.4688
   BR   -63.7420    142.0636      0.4898
   CL   -72.7849     72.0525      0.6066
   MA    11.0533    137.8404      1.3061
   ND    17.7331  -122.6815      0.1162
   AP     -6.5763    -83.9776      0.4881
   BU     -6.1254    -78.1008      2.2287
   MS      2.1477    -56.0916      3.5655
   BS     -1.4855    121.6413      2.4753
   TI     -4.4363    113.4976      1.8639
   ON    36.1163    137.9182      2.5391
   --   --------    --------      ------
```

$$\frac{\mathsf{d}\varphi}{\mathsf{d}t} = \Omega \cdot \cos\Phi \cdot \sin(\lambda - \Lambda)$$
$$\frac{\mathsf{d}\lambda}{\mathsf{d}t} = \Omega \cdot [\sin\Phi - \cos(\lambda - \Lambda) \cdot \operatorname{tg}\varphi \cos\Phi]$$

EU NNR-NUVEL1

$$\Omega = 0.2337^\circ/10^6\ lat,$$
$$\Lambda = 247.725^\circ,$$
$$\Phi = 50.631^\circ$$

$$\frac{\mathsf{d}\varphi}{\mathsf{d}t} = \Omega \cdot \cos\Phi \cdot \sin(\lambda - \Lambda)$$
$$\frac{\mathsf{d}\lambda}{\mathsf{d}t} = \Omega \cdot [\sin\Phi - \cos(\lambda - \Lambda) \cdot \operatorname{tg}\varphi \cos\Phi]$$

V_n, V_e, V_u ?
V, α ?

EU NNR-NUVEL1

$$\Omega = 0.2337^\circ/10^6\ lat,$$
$$\Lambda = 247.725^\circ,$$
$$\Phi = 50.631^\circ$$

EU NNR-NUVEL1

$$\omega_X = -0.000981,$$
$$\omega_Y = -0.002395,$$
$$\omega_Z = \quad 0.003153 \ [rad/10^6 \ lat]$$

$$V_X = \omega_Y Z - \omega_Z Y$$
$$V_Y = \omega_Z X - \omega_X Z$$
$$V_Z = \omega_X Y - \omega_Y X$$

EU NNR-NUVEL1

$$\omega_X = -0.000981,$$
$$\omega_Y = -0.002395,$$
$$\omega_Z = \ \ 0.003153 \ [rad/10^6 \ lat]$$

Do układu lokalnego

Do układu lokalnego

$$\begin{bmatrix} V_e \\ V_n \\ V_u \end{bmatrix} = \begin{bmatrix} -\sin\lambda & \cos\lambda & 0 \\ -\sin\varphi\cos\lambda & -\sin\varphi\sin\lambda & \cos\varphi \\ \cos\varphi\cos\lambda & \cos\varphi\sin\lambda & \sin\varphi \end{bmatrix} \cdot \begin{bmatrix} V_x \\ V_y \\ V_z \end{bmatrix}$$

O modelach ruchu płyt (b.d.). URL: http://www.ucmp.berkeley.edu/geology/tectonics.html.

UNAVCO *plate motion calculator* (b.d.). URL: http://www.unavco.org/community_science/science-support/crustal_motion/dxdt/model.html.