Product Description Document
Experimental International Tsunami Products for the Pacific Basin
August 2014

Part I – Mission Connection

Product Description – PTWC is seeking comments on an experimental International graphical and statistical tsunami threat information product that will be disseminated via email to a country's designated Tsunami Warning Focal Point (TWFP) to support decision-making by that country's tsunami warning organization. The email will also contain the accompanying international Tsunami Threat text messages (WEPA40). The tsunami warning organization may use the PTWC information as primary or supplemental guidance for determining their level of alert, and is responsible for issuing applicable alert levels such as warnings and watches to its own emergency management and stakeholder agencies, and/or the public.

PTWC's New Enhanced Graphical and Forecast Statistical Product suite was first issued in an experimental phase starting 15 April 2013, in parallel with PTWC's existing products in order to familiarize recipients (the designated national Tsunami Warning Focal Points and National Tsunami Warning Centers) with the new products' timing and content. A separate set of US domestic products is also being implemented by PTWC to cover American Samoa, Guam, Rota, Tinian, and Saipan, formerly only included in PTWC's international products, to give alert levels to those places that will now no longer get alerts in the international product.

Purpose – Increases in data availability and quality over the last 10 years, as well as the development of real time forecasting capabilities, have enabled faster and more reliable real-time earthquake source characterization and more timely and accurate tsunami forecasting. These factors have led to the enhancement of PTWC products to provide countries with more informative and useful tsunami threat assessments to their coasts.

Audience – International Tsunami Warning System customers in the Pacific basin.

Presentation format - email only to country-designated Tsunami Warning Focal Points (TWFP). The email will contain

a) The Graphical forecasts and Statistics table (examples are provided below) –:
   - Coastal Tsunami Amplitude Forecast Polygon Map - Overview
   - Deep-Ocean Tsunami Amplitude Forecast Map with Tsunami Travel Times – Pacific-wide
   - Coastal Tsunami Amplitude Forecast Map – Pacific-wide and Regional, with Tsunami Travel Times
   - Coastal Tsunami Amplitude Forecast KMZ– input to Google Earth
   - Table of Forecast Statistics for Regional Polygons

b) Public Messages Summary Information in text format (WEPA40)

Feedback method – We are always seeking to improve our services based on user feedback. A survey to solicit comments on these products can be found at the following link:

www.nws.noaa.gov/survey/nws-survey.php?code=EITPPB

Experimental feedback period is September 9, 2014 through September 23, 2014.

Comments regarding the new products can also be sent to the PTWC Director:
Dr. Charles McCreery, Director
NOAA/NWS Pacific Tsunami Warning Center
91-270 Fort Weaver Road
Ewa Beach, HI 96706
Tel: 808-689-8207
Email: charles.mccreery@noaa.gov

Part II – Technical Description

a) Format and science basis – The PTWC will use the Real-time Inundation Forecast of Tsunamis (RIFT) model as the basis for its international forecast products for the PTWS. Developed by PTWC, RIFT is currently a tsunami forecast model of NOAA that is based on the linear shallow water equations. Studies of its accuracy for a wide variety of sources and coasts are continuing. Its general success in forecasting impacts from several recent tsunamis, including the February 2010 Chile tsunami and the March 2011 Japan tsunami, its unique capability to use real-time estimates of the actual earthquake fault geometry as the primary source constraint, and its capability to produce comprehensive forecast for all coasts around the world in real time have made RIFT the foundation of PTWC's international tsunami forecast operations. It should be noted PTWC also uses several other forecast models during an event, including NOAA's SIFT (Short-term Inundation Forecasting for Tsunamis) and ATFM (Alaska Tsunami Forecast Model), but these models are primarily for U.S. coasts -- they do not cover all coasts and countries around the Pacific.

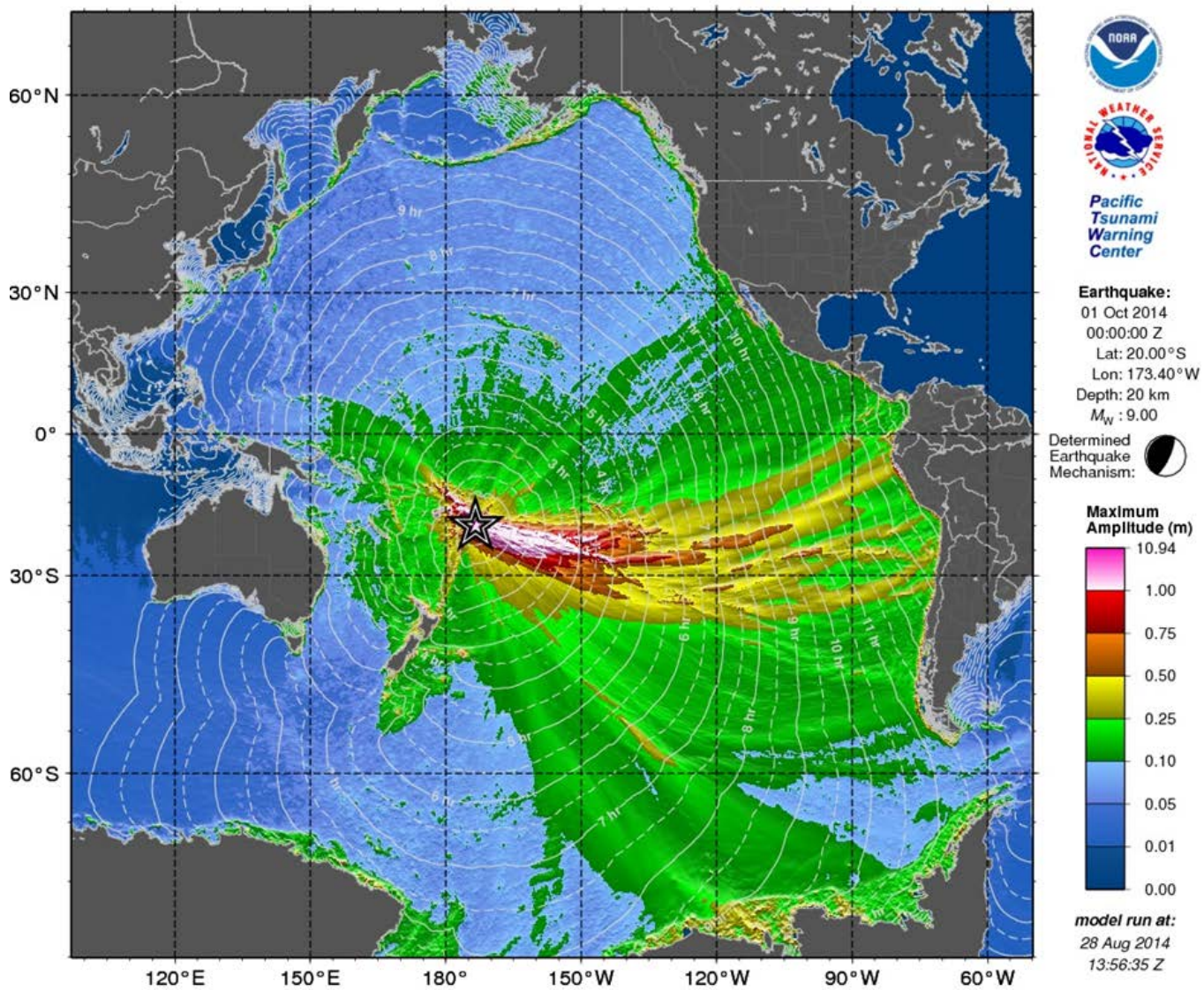
b) Product availability – These products will be issued via email whenever an event occurs which exceeds earthquake magnitude thresholds set by the PTWC.

c) Additional information – The products are created by the PTWC product generation software.

PTWC Deep-Ocean Tsunami Amplitude Forecast

This map should not be used to estimate coastal tsunami amplitudes or impacts.
Deep-ocean amplitudes are usually much smaller than coastal amplitudes.

This message is issued for information only in support of the UNESCO/IOC Pacific Tsunami Warning and Mitigation System and is meant for national authorities in each country of that system. National authorities will determine the appropriate level of alert for each country and may issue additional or more refined information.



PTWC Coastal Tsunami Amplitude Forecast

Actual amplitudes at the coast may vary from forecast amplitudes due to uncertainties in the forecast and local features. In particular, maximum tsunami amplitudes on atolls will likely be much smaller than the forecast indicates.

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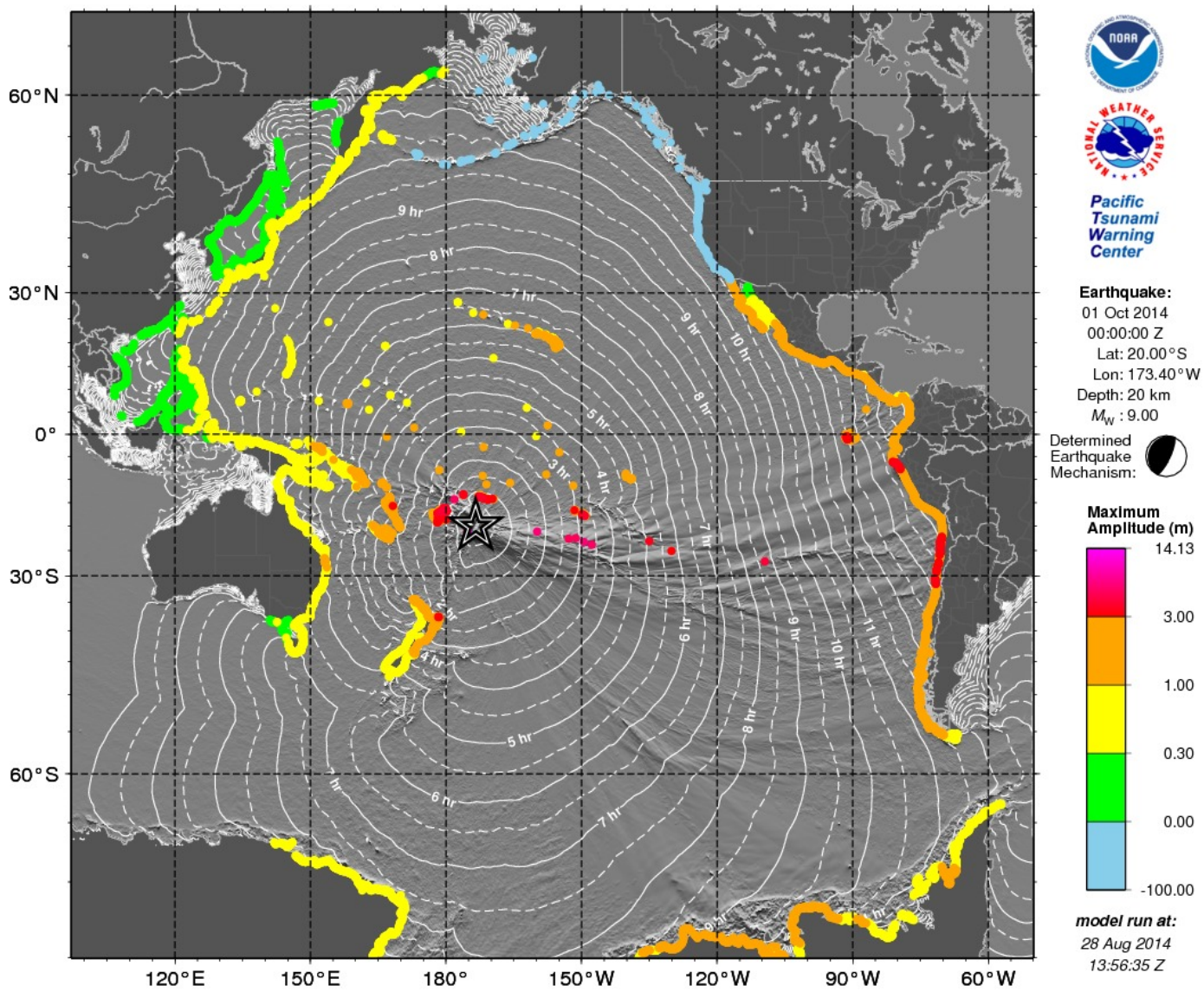

PTWC Coastal Tsunami Amplitude Forecast Polygons

Actual amplitudes at the coast may vary from forecast amplitudes due to uncertainties in the forecast and local features. In particular, maximum tsunami amplitudes on atolls will likely be much smaller than the forecast indicates.

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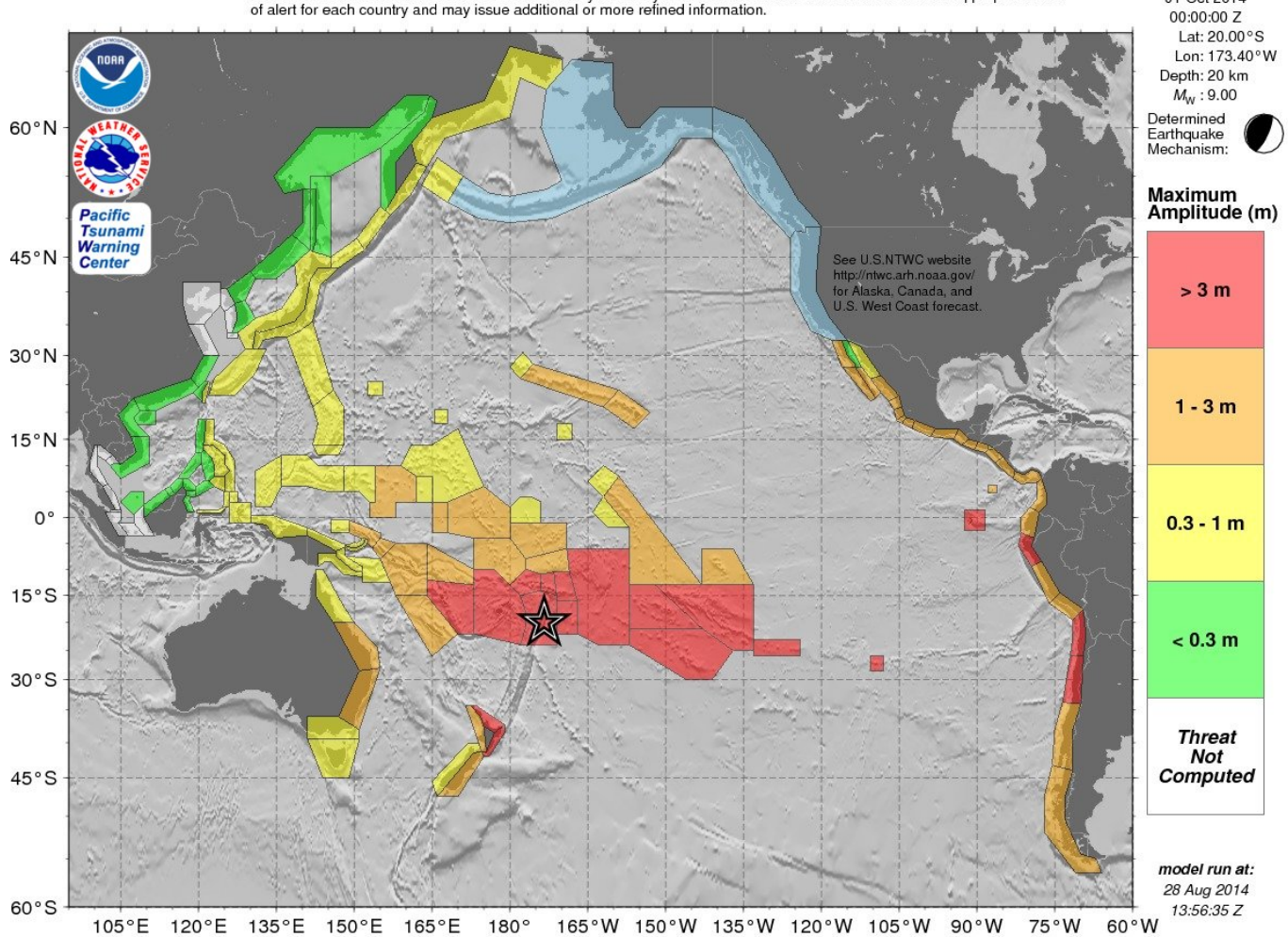

Sample of kmz file in GoogleEarth

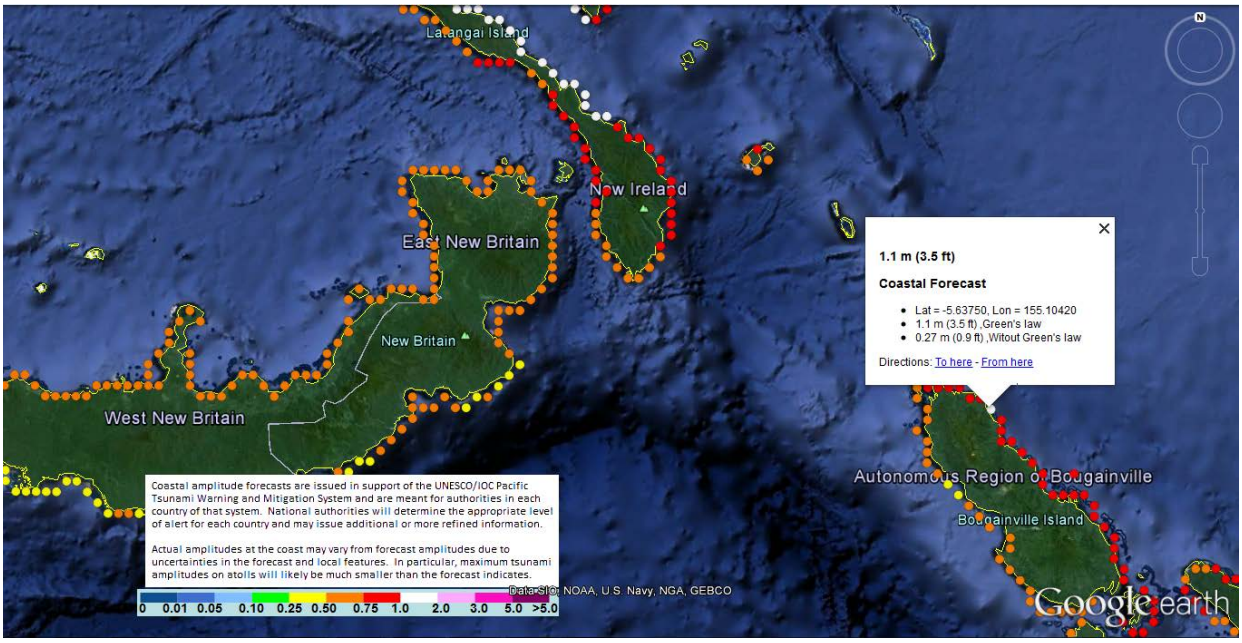

Table of Forecast Statistics for Polygons

a. Table of Forecast Statistics for Polygons

This table provides some statistics on the coastal forecast values provided within each polygon. “Region Name” is a name that should unambiguously describe the location of the polygon. There are two categories of coastal point values for which statistics are given. The first, “Coastal Forecast,” represents the Green’s Law coastal forecast values depicted on the coastal forecast maps and in the KML file. The second, “Offshore Forecast,” represents the model values without Green’s Law applied. Both values can be individually viewed using the KML file. “Total Points” are the total number of coastal points computed within the polygon for the model run over the domain and at the grid resolution that was used.

PTWC TABLE OF FORECAST STATISTICS FOR REGIONAL POLYGONS - RUN ID 20140828135635
(for internal use only - not for distribution)

Earthquake - Origin: 10/01/2014 00:00:00 UTC Coordinates: 20.0S 173.4W Depth: 020km Magnitude: 9.0

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Actual amplitudes at the coast may vary from forecast amplitudes due to uncertainties in the forecast and local features. In particular, maximum tsunami amplitudes on atolls will likely be much smaller than the forecast indicates.

	Coastal Forecast (meters)				Offshore Forecast (meters)				Total
Region_Name	Maximum	Mean	Median	STD	Maximum	Mean	Median	STD	Points
Tonga	14.	7.31	5.21	3.96	7.0	5.50	5.66	1.17	4
Niue	14.	13.55	13.55	0.00	1.8	1.76	1.76	0.00	1
Austral_Islands	8.3	7.36	7.20	0.59	1.4	1.33	1.34	0.03	4
Cook_Islands	8.1	3.73	1.60	3.12	1.2	0.54	0.20	0.47	3
Wallis_and_Futuna	7.0	4.13	3.80	1.51	2.1	1.44	1.21	0.38	5
Easter_Island	5.4	5.38	5.38	0.00	1.2	1.18	1.18	0.00	1
Fiji	5.3	3.07	3.06	1.06	3.6	1.31	1.21	0.58	151
Society_Islands	4.9	2.92	2.68	0.87	2.2	0.78	0.77	0.37	35
Samoa	4.7	2.86	2.55	1.04	1.7	0.78	0.69	0.36	40
Tuamotu_Archipelago	4.1	4.09	4.09	0.00	0.78	0.78	0.78	0.00	1
North_Central_Chile	3.9	2.57	2.54	0.50	4.0	1.49	1.31	0.66	120
Northern_Peru	3.9	2.80	2.58	0.64	3.0	1.67	1.64	0.47	100
Northern_Chile	3.7	2.60	2.71	0.65	3.7	1.06	0.98	0.52	119
American_Samoa	3.5	2.42	2.23	0.69	1.1	0.71	0.79	0.26	18
Galapagos_Islands	3.4	2.10	1.82	0.72	1.7	0.71	0.60	0.37	94

North_Side_of_North_Island_New_Zealand	3.2	1.99	1.89	0.37	3.5	1.50	1.51	0.43	114
Pitcairn_Islands	3.2	3.16	3.16	0.00	0.53	0.53	0.53	0.00	1
East_Side_of_North_Island_New_Zealand	3.2	1.32	1.18	0.38	2.0	0.79	0.71	0.37	88
Vanuatu	3.0	1.69	1.73	0.38	1.8	0.60	0.52	0.32	189
South_Central_Chile	2.9	1.86	1.77	0.39	2.2	1.11	1.04	0.36	167
Central_Peru	2.8	1.85	1.77	0.40	2.3	1.37	1.40	0.38	104
Southern_Chile	2.7	1.42	1.35	0.50	1.7	0.72	0.67	0.28	382
Southern_Peru	2.6	2.09	2.10	0.22	2.4	1.24	1.15	0.45	76
Ecuador	2.6	1.20	1.59	0.87	1.8	0.68	0.86	0.52	151
Santa_Cruz_Islands	2.4	1.84	1.83	0.30	1.4	0.66	0.61	0.28	18
Pacific_Coast_of_Costa_Rica	2.3	1.57	1.54	0.22	1.5	0.89	0.90	0.22	79
Pacific_Coast_of_Panama	2.3	1.44	1.56	0.37	1.5	0.72	0.68	0.28	91
New_Caledonia	1.9	1.19	1.21	0.29	1.4	0.74	0.72	0.27	153
Gilbert_Islands_Kiribati	1.9	1.91	1.91	0.00	0.45	0.45	0.45	0.00	1
Marie_Byrd_Land_Coast_of_Antarctica	1.8	1.25	1.18	0.24	3.1	0.67	0.56	0.35	570
Hawaii	1.7	1.11	1.11	0.22	1.2	0.43	0.35	0.21	147
Oaxaca_Mexico	1.6	1.26	1.24	0.15	1.3	0.74	0.70	0.23	68
Pohnpei_State_Micronesia	1.6	1.26	1.27	0.23	1.1	0.46	0.33	0.28	10
Michoacan_Mexico	1.6	1.26	1.25	0.16	1.4	0.63	0.59	0.23	27
Jalisco_Mexico	1.5	1.31	1.28	0.15	1.5	0.79	0.79	0.31	33
Guerrero_Mexico	1.5	1.31	1.29	0.12	1.5	0.87	0.88	0.23	56
Marquesas_Islands	1.5	1.25	1.22	0.16	0.76	0.34	0.31	0.15	24
West_Side_of_North_Island_New_Zealand	1.5	0.78	0.77	0.15	1.1	0.70	0.66	0.17	76
Nayarit_Mexico	1.5	1.20	1.19	0.16	1.1	0.68	0.73	0.26	32
New_Ireland	1.5	0.88	0.83	0.22	0.96	0.28	0.22	0.16	127
Pacific_Coast_of_Colombia	1.5	1.16	1.14	0.12	1.1	0.71	0.73	0.19	98
Pacific_Side_of_Baja_Mexico	1.5	1.20	1.19	0.12	1.2	0.71	0.70	0.17	75
Line_Islands_Kiribati	1.4	1.24	1.18	0.14	0.33	0.23	0.20	0.07	3
Cocos_Island_Costa_Rica	1.4	1.42	1.42	0.00	0.29	0.29	0.29	0.00	1
Pacific_Side_of_Baja_Sud_Mexico	1.4	1.18	1.15	0.11	1.3	0.78	0.78	0.21	110
Choisel_to_Philip_Solomon_Islands	1.4	0.86	0.83	0.21	1.2	0.36	0.32	0.19	339
Pacific_Coast_of_Nicaragua	1.4	1.15	1.15	0.10	1.1	0.87	0.90	0.15	35
Colima_Mexico	1.4	1.21	1.21	0.07	1.3	0.83	0.75	0.25	12
Tokelau	1.3	1.31	1.31	0.00	0.33	0.33	0.33	0.00	1
Chiapas_Mexico	1.3	1.17	1.26	0.14	0.95	0.72	0.69	0.12	28
Gulf_Side_of_Baja_Sud_Mexico	1.3	0.54	0.43	0.23	1.0	0.21	0.19	0.15	99
Ellsworth_Land_Coast_of_Antarctica	1.2	0.92	0.87	0.16	1.8	0.57	0.53	0.25	274
Pacific_Coast_of_Guatemala	1.2	1.14	1.10	0.07	0.99	0.72	0.74	0.14	33
El_Salvador	1.2	1.11	1.12	0.09	1.2	0.81	0.81	0.17	37
Sinaloa_Mexico	1.2	0.79	0.77	0.24	1.3	0.51	0.49	0.25	77
NW_Hawaiian_Islands	1.2	0.96	1.03	0.17	0.74	0.53	0.56	0.18	5
Tuvalu	1.2	1.16	1.16	0.00	0.15	0.15	0.15	0.00	1
Nauru	1.1	1.14	1.14	0.00	0.17	0.17	0.17	0.00	1
Northeast_Side_of_the_Antarctic_Peninsula	1.1	0.88	0.89	0.14	1.5	0.40	0.36	0.18	436

Phoenix_Islands_Kiribati	1.1	1.10	1.10	0.00	0.29	0.29	0.29	0.00	1
East_Side_of_South_Island_New_Zealand	1.1	0.84	0.85	0.13	1.0	0.58	0.56	0.14	158
Southern_Queensland_Australia	1.1	0.68	0.61	0.21	0.85	0.39	0.36	0.14	142
Bougainville_Papua_New_Guinea	1.1	0.76	0.79	0.16	0.83	0.42	0.41	0.16	75
New_South_Wales_Australia	1.0	0.82	0.80	0.08	1.4	0.72	0.71	0.14	150
Pacific_Coast_of_Honduras	0.98	0.98	0.98	0.00	0.75	0.65	0.61	0.08	3
East_Coast_of_Japanese_Main_Islands	0.98	0.62	0.61	0.10	0.85	0.40	0.39	0.15	407
West_Side_of_South_Island_New_Zealand	0.96	0.81	0.83	0.11	1.2	0.54	0.56	0.24	139
Marshall_Islands	0.93	0.74	0.74	0.13	0.77	0.42	0.38	0.27	4
Guam	0.92	0.68	0.68	0.10	0.41	0.23	0.21	0.09	12
Jarvis_Island	0.89	0.89	0.89	0.00	0.13	0.13	0.13	0.00	1
Johnston_Island	0.88	0.88	0.88	0.00	0.14	0.14	0.14	0.00	1
Manus_Island_Papua_New_Guinea	0.87	0.78	0.81	0.09	0.77	0.43	0.43	0.11	23
Trobriand_Woodlark_and_Louisiade_Islands	0.87	0.69	0.71	0.11	0.86	0.40	0.41	0.17	71
Bismarck_Sea_Coast_of_Papua_New_Guinea	0.87	0.63	0.62	0.09	0.81	0.24	0.21	0.12	152
Pacific_Side_of_Papua_Indonesia	0.87	0.55	0.55	0.10	0.68	0.26	0.25	0.11	266
Palmyra_Island	0.86	0.86	0.86	0.00	0.13	0.13	0.13	0.00	1
Victoria_Oates_and_George_V_Coast_of_Antarctica	0.86	0.65	0.68	0.11	1.2	0.35	0.32	0.15	548
Chuuk_State_Micronesia	0.86	0.86	0.86	0.00	0.73	0.73	0.73	0.00	1
Talaud_Islands_Indonesia	0.83	0.51	0.52	0.17	0.46	0.21	0.20	0.09	19
New_Britain-Solomon_Sea_Coast_of_New_Britain	0.80	0.55	0.54	0.10	0.52	0.22	0.20	0.09	82
New_Britain-Bismarck_Sea_Coast_of_New_Britain	0.80	0.60	0.60	0.05	0.57	0.29	0.29	0.10	86
Howland_and_Baker	0.79	0.79	0.79	0.00	0.09	0.09	0.09	0.00	1
Coral_Sea_Coast_of_Papua_New_Guinea	0.79	0.41	0.37	0.10	0.61	0.27	0.22	0.12	164
Kuril_Islands_Russia	0.79	0.47	0.46	0.14	0.73	0.23	0.20	0.15	95
Tasmania	0.78	0.51	0.56	0.18	0.62	0.35	0.36	0.13	167
Solomon_Sea_Coast_of_Papua_New_Guinea	0.77	0.51	0.50	0.09	0.55	0.19	0.17	0.09	141
Urup_Etorofu_Kunashiri_Shikotan_and_Habomai_Islands	0.76	0.42	0.37	0.16	0.69	0.21	0.16	0.14	101
Pacific_Coast_of_Kamchatka_Russia	0.75	0.64	0.65	0.07	0.83	0.45	0.46	0.14	157
Kosrae_State_Micronesia	0.75	0.75	0.75	0.00	0.09	0.09	0.09	0.00	1
Victoria_Australia	0.72	0.40	0.28	0.16	0.81	0.29	0.23	0.16	130
Northern_Marianas	0.72	0.55	0.55	0.08	0.52	0.15	0.10	0.10	19
Palau	0.70	0.51	0.49	0.08	0.47	0.24	0.25	0.10	15
Midway_Island	0.68	0.63	0.60	0.04	0.64	0.55	0.51	0.06	3
West_Coast_of_Japanese_Main_Islands	0.68	0.13	0.05	0.17	0.49	0.07	0.03	0.09	465
Halmahera_Indonesia	0.66	0.38	0.37	0.11	0.55	0.19	0.17	0.09	190
Pacific_Coast_of_the_Philippines	0.66	0.46	0.47	0.09	0.61	0.23	0.22	0.10	350
Izu_and_Ogasawara_Islands_Japan	0.63	0.61	0.61	0.02	0.32	0.25	0.25	0.07	2
Komandorsky_Islands_Russia	0.61	0.50	0.49	0.07	0.75	0.37	0.32	0.19	38
Northern_Queensland_Australia	0.61	0.44	0.44	0.07	0.44	0.23	0.22	0.08	211
Nansei_Islands_Japan	0.60	0.47	0.49	0.08	0.50	0.29	0.29	0.10	81
Bering_Sea_Coast_of_Eastern_Russia	0.58	0.38	0.38	0.08	0.74	0.26	0.26	0.08	328
Wake_Island	0.57	0.54	0.53	0.02	0.10	0.09	0.08	0.01	3
Interior_Seas_of_the_Philippines	0.53	0.08	0.05	0.09	0.27	0.03	0.02	0.04	264

Eastern_Coast_of_Taiwan	0.51	0.44	0.45	0.07	0.32	0.16	0.14	0.06	49
Yap_State_Micronesia	0.47	0.47	0.47	0.00	0.47	0.47	0.47	0.00	1
Sonora_Mexico	0.46	0.30	0.29	0.05	0.22	0.11	0.11	0.05	97
Minamitorishima_Japan	0.43	0.43	0.43	0.00	0.06	0.06	0.06	0.00	1
Celebes_Sea_Coast_of_Sulawesi_Indonesia	0.39	0.24	0.23	0.05	0.28	0.13	0.12	0.05	87
Sangihe_Islands_Indonesia	0.38	0.30	0.29	0.04	0.28	0.12	0.09	0.07	13
Celebes_Sea_Coast_of_the_Philippines	0.35	0.21	0.21	0.03	0.20	0.09	0.09	0.04	67
Gulf_Side_of_Baja_Mexico	0.30	0.27	0.26	0.01	0.08	0.06	0.06	0.01	40
Western_Coast_of_Kamchatka_Russia	0.30	0.16	0.13	0.06	0.32	0.17	0.15	0.05	54
Western_Coast_of_Taiwan	0.29	0.24	0.22	0.03	0.22	0.11	0.10	0.04	32
Southeastern_Coast_of_China	0.29	0.28	0.28	0.02	0.17	0.11	0.11	0.03	30
Western_Coast_of_the_Northern_Philippines	0.29	0.13	0.10	0.07	0.38	0.07	0.05	0.07	125
Sea_of_Okhotsk_Coast_of_Sakhalin_Russia	0.26	0.20	0.21	0.04	0.27	0.16	0.16	0.05	150
Sulu_Archipelago_Philippines	0.26	0.20	0.21	0.05	0.14	0.09	0.08	0.03	52
Southern_Coast_of_China	0.22	0.15	0.17	0.04	0.13	0.08	0.09	0.02	130
Celebes_Sea_Coast_of_Borneo_Indonesia	0.20	0.17	0.17	0.02	0.12	0.07	0.07	0.02	57
Celebes_Sea_Coast_of_Sabah_Malaysia	0.18	0.17	0.17	0.01	0.11	0.07	0.07	0.01	27
Sulu_Sea_Coast_of_the_Philippines	0.13	0.04	0.03	0.02	0.04	0.01	0.01	0.01	120
East_Coast_of_Russia_on_the_Sea_of_Okhotsk	0.13	0.13	0.13	0.00	0.10	0.07	0.06	0.02	61
Palawan_Island_Philippines	0.11	0.05	0.05	0.03	0.05	0.03	0.03	0.01	130
Southern_Coast_of_Vietnam	0.07	0.05	0.05	0.01	0.06	0.03	0.03	0.01	112
East_Coast_of_Russia_on_the_Tatarskiy_Straight	0.07	0.05	0.05	0.01	0.05	0.03	0.02	0.01	43
Hainan_Island_China	0.07	0.06	0.06	0.00	0.05	0.03	0.03	0.01	46
Tatarskiy_Straight_Coast_of_Sakhalin_Russia	0.07	0.06	0.07	0.01	0.10	0.05	0.04	0.02	47
East_Coast_of_Russia_north_of_the_Korean_Peninsula	0.06	0.03	0.03	0.01	0.04	0.02	0.02	0.01	148
Northern_Coast_of_Vietnam	0.06	0.05	0.06	0.01	0.05	0.03	0.03	0.01	33
Sulu_Sea_Coast_of_Sabah_Malaysia	0.06	0.04	0.03	0.01	0.07	0.03	0.02	0.01	54
Northwest_Coast_of_Sabah_Malaysia	0.04	0.04	0.04	0.00	0.03	0.02	0.02	0.00	51
Brunei	0.04	0.03	0.03	0.00	0.02	0.02	0.02	0.00	16
Southwest_Coast_of_Sabah_Malaysia	0.04	0.04	0.03	0.00	0.02	0.02	0.02	0.00	42
Eastern_Coast_of_DPR_of_Korea	0.04	0.02	0.03	0.00	0.03	0.02	0.01	0.01	89
Eastern_Coast_of_the_Republic_of_Korea	0.03	0.03	0.03	0.00	0.07	0.02	0.02	0.01	59
Natuna_Islands_Indonesia	0.03	0.03	0.03	0.00	0.02	0.01	0.01	0.00	6