World Ocean Volumes

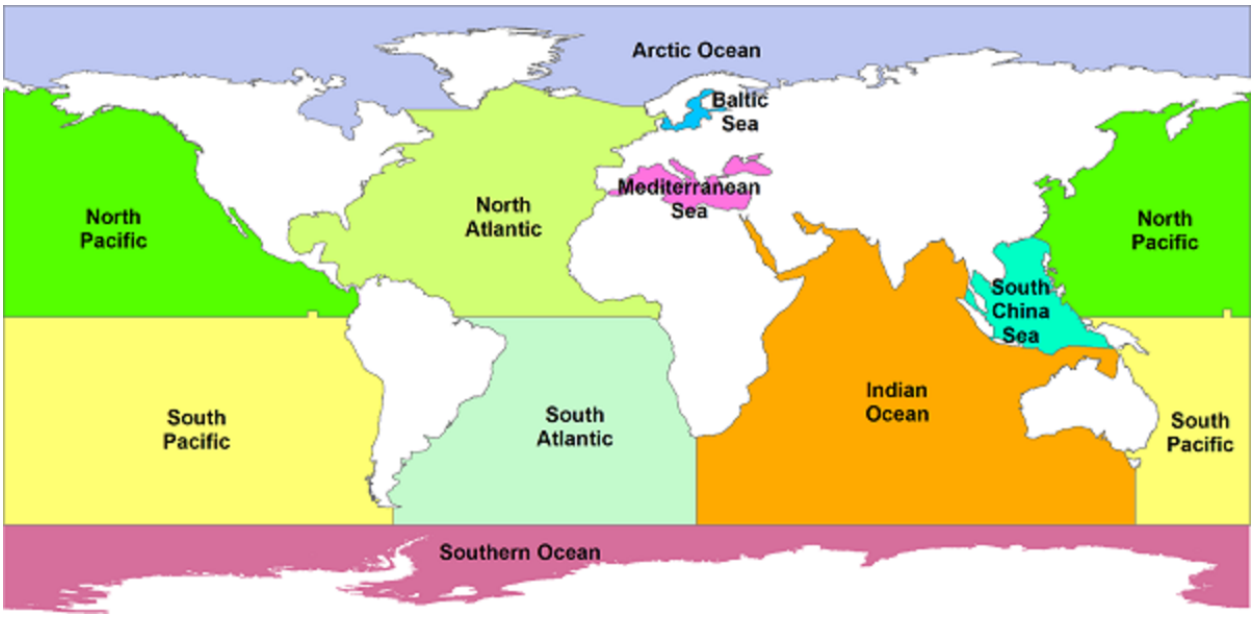
Ocean, oceanic region and sea volumes calculated using the Ice Surface version of ETOPO1.

	Area+ (km2)	% Ocean Area	Volume (km3)	% Ocean Volume	Avg. Depth (m)	Max Depth (m)
Arctic Ocean	15,558,000	4.3	18,750,000	1.4	1205	5567
Atlantic Ocean	85,133,000	23.5	310,410,900	23.3	3646	8486
Baltic Sea	406,000	0.1	20,900	0.0	51	392
Mediterranean	2,967,000	0.8	4,390,000	0.3	1480	5139
North Atlantic	41,490,000	11.5	146,000,000	10.9	3519	8486
South Atlantic	40,270,000	11.1	160,000,000	12.0	3973	8240
Indian Ocean	70,560,000	19.5	264,000,000	19.8	3741	7906
Pacific Ocean	161,760,000	44.7	660,000,000	49.4	4080	10,803
North Pacific	77,010,000	21.3	331,000,000	24.8	4298	10,803#
South Pacific	84,750,000	23.4	329,000,000	24.6	3882	10,753
South China Sea	6,963,000	1.9	9,880,000	0.7	1419	7352
Southern Ocean*	21,960,000	6.1	71,800,000	5.4	3270	7075

Total:	361,900,000¤	100.0	1,335,000,000	100.0	3688	10,803
Error Estimates	0.10%		1%			

Ocean Boundaries

Ocean boundaries were modified from 'The Limits of Oceans and Seas' [IHO Special Publication 23, 1953] to include only major oceans and marginal seas and to include the Southern Ocean south of 60°S.



Volumes were calculated for each ocean grid cell in ETOPO1 using Equation 1 to determine cell area, and Equation 2 to determine cell volume. Cell areas and volumes were then summed over each ocean or marginal sea.

Equation 1

$$dA = a2\,cos(ø)\,(1 - e2)\,dø\,dl\,/\,(1 - e2\,sin2ø)2$$

Equation 2

$$dV = dA * depth$$

Location

- Latitude (ø) = latitude of cell's center (in radians) Unit of Latitude (dø) = 1 arc-minute (2.908882 x10-4 radians) Unit of Longitude (dl) = 1 arc-minute (2.908882 x10-4 radians)

- The WGS84 spheroid was used for values of Earth's radius and eccentricity:
- Equatorial radius (a) = 6378.137 km Eccentricity (e) = 0.08181919