





Large errors in relative elevation and sea-level rise assessments of the world's coastlines

Case for the Mekong delta, Vietnam

Philip S.J. Minderhoud^{1,2}, L. Coumou¹, H. Middelkoop¹, G. Erkens^{2,1}, E. Stouthamer¹

2 Department of Subsurface and Groundwater Systems, Deltares Research Institute, Utrecht, The Netherlands

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plain	 Sand spit
asin	 Swamp
ain	Tidal flat
ve marsh	Late Pleistocene undef. dep.
	Unknown
each ridge or sand dune	Weathered land

Expected relative	wiedli elevation (iii)					
elevation	Topo DEM	SRTM DEM	MERIT DEM			
Very high	3.27	6.37	6.87			
Higher	1.84	3.11	4.67			
Higher	1.38	2.84	4.19			
Benchmark	<u>0.85</u>	<u>2.83</u>	<u>3.54</u>			
Highest (++)	1.38	4.11	4.67			
Higher (+)	1.41	3.17	5.06			
Higher (+)	0.91	2.65	3.48			
Lower (-)	0.85	2.57	3.73			
Lower (-)	0.66	2.44	3.49			
Benchmark	<u>0.99</u>	<u>2.20</u>	<u>1.47</u>			
Higher (+)	1.14	2.67	2.78			
Higher (+)	0.84	2.19	1.58			
Equal (+/-)	0.97	2.35	2.29			
Equal (+/-)	0.83	2.14	3.13			
Lower (-)	0.53	2.15	2.87			
Lowest ()	0.34	2.65	2.69			





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			SRTM DEM		MERIT DEM		Transposed MERIT DEM		Topo DEM	
	1 m		0 m	1 m	0 m	1 m	0 m	1 m	0 m	1 m
			SLR	SLR	SLR	SLR	SLR	SLR	SLR	SLR
100	Elevation below sea level	Delta plain area below MSL (x 1.000 km²)	5.5	11.9	0.2	0.8	10.2	23.9	0.3	28.5
-7-	following 1 meter SLR (m)	Delta plain area below MSL (% of total area)	14%	31%	1%	2%	25%	59%	1%	75%
	0.8 0.2 0.7 0.1	Estimated number of people below MSL (x 10 ⁻⁶)	2.4	5.1	0.1	0.3	4.1	9.7	0.1	12.3
50 I	100 km 0.5 >0.0	Estimated number of people below MSL (% of total population)	14%	29%	1%	2%	23%	55%	1%	70%

• The Mekong delta has an extremely low mean elevation of ~0.8 m above mean sea level, dramatically lower than the ~ 2.6 m suggested by analyses based on global, satellite-based elevation data.

• This demonstrates that accuracy problems in global datasets of coastal elevation and offsets between vertical datum and actual local sea level may have profound implications for coastal elevation to sea level and sea-level rise impact assessments worldwide, especially for data sparse regions, with elevation errors potentially larger than a century of sea level rise (confirmed by Kulp & Strauss 2019, October 2019).

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Mekong delta much lower than previously assumed in sea-level rise impact assessments

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Absolute elevation validation: national benchmarks

Conclusions