

## PRISM3 Mean Annual Sea Surface Temperature Estimation Methods

**Cite Dowsett et al. (2010) when using this data set.** We employ five methods to calculate the single PRISM mean annual sea surface temperature (SST) value at each site shown in this data set. See Dowsett et al. (2010) for a complete discussion.

1) The mean annual SST value is the average of faunal-based cold and warm season estimates for PRISM sites that only have faunal-based SST estimates and for PRISM sites that have additional proxy estimates that fall between the faunal-based cold and warm season estimates. This formula is applied to the vast majority of PRISM sites (60 of 86 sites).

2) For PRISM sites having Mg/Ca and/or alkenone-based SST estimates that do not fall between the faunal-based cold and warm season estimates (six of 86 sites), the mean annual SST value is calculated on a case-by case-basis.

3) Four PRISM sites do not have faunal/floral-based estimates. In this case, the Mg/Ca or alkenone-based estimate is accepted as the mean annual SST value. This formula applies to Sites 1014 and 907.

4) Exceptions to #3 apply in the high northern latitudes where alkenones are the only proxy available due to the lack of carbonate material. At Sites 909 and 911, the mean annual SST is the average of the alkenone-based temperature estimate and the value from the appropriate latitude and longitude grid cell from the PRISM3 February SST reconstruction.

5) In the high southern latitudes, 18 SST estimates are based solely on diatom assemblages that only record the warm season (February) estimate. Here, the mean annual SST is the average of the fossil-based temperature estimate and the value from the appropriate latitude and longitude grid cell from the PRISM3 August SST reconstruction.

We report SST anomalies (mid-Pliocene minus modern; Table 1) to remove differences inherent in proxy calibrations. In calculating alkenone- and Mg/Ca-derived temperature anomalies, we use modern SST values from Levitus and Boyer (1994), and for faunal-based anomalies, we use modern February and August SST values from Reynolds and Smith (1995) because these respective data sets were used for individual proxy calibrations.

Dowsett, H.J., Robinson, M.M., Stoll, D.K. and Foley, K.M., 2010. Mid-Piacenzian mean annual sea surface temperature analysis for data-model comparisons. *Stratigraphy* 7: 189-198.  
Levitus, S. and Boyer, T.P., 1994. World Ocean Atlas 1994, in: Temperature, NOAA Atlas NESDIS 4, U.S. Department of Commerce, *NOAA*, Washington, DC.  
Reynolds, R.W. and Smith, T.M., 1995. A high-resolution global sea surface temperature climatology, *Journal of Climate* 8: 1571-1583.

**Table 1. PRISM3 proxy-based and mean annual SST anomalies.**

Locality	Latitude °N	Longitude °E	Water Depth (m)	Faunal/Floral (°C)			Mg/Ca (°C)	Alkenone (°C)	PRISM (°C)
				Feb	Aug	Mean			
DSDP 310	36.87	-176.90	3516.0	3.0	2.0	2.5	-	-	2.5
ODP 886	44.69	-168.24	5713.7	-2.6	3.1	0.3	-	-	0.3
DSDP 183	54.58	-161.21	4708.0	-1.2	2.3	0.5	-	-	0.6
E14-8	-59.67	-160.29	3877.0	0.9	-	-	-	-	-0.9
Colvillian	70.29	-150.42	-	2.0	4.0	3.0	-	-	3.0
ODP 887	54.37	-148.45	3633.6	2.0	1.0	1.5	-	-	1.5
DSDP 573	0.49	-133.30	4301.0	-1.0	-0.2	-0.6	-	-	-0.6
DSDP 36	40.98	-130.12	3273.0	2.0	2.0	2.0	-	-	2.0
ODP 1021	39.09	-127.78	4213.0	4.4	7.5	5.9	-	-	5.9
E13-17	-65.68	-124.11	4724.0	4.4	-	-	-	-	3.3
ODP 1014	32.83	-119.98	1165.7	-	-	-	-	7.7	7.7
ODP 852	5.28	-110.07	3860.1	1.8	3.2	2.5	-	-	2.5
Meighen Island	79.00	-99.00	-	2.0	5.0	3.5	-	-	3.5
DSDP 323	-63.68	-97.99	5004.0	1.2	-	-	-	-	0.0
ODP 847	0.18	-95.32	3334.5	2.4	3.6	3.0	1.1	2.1	3.0
ODP 677	1.20	-83.74	3472.5	2.6	1.1	1.9	-	1.6	1.9
Sarasota	27.25	-82.66	-	-0.6	-2.4	-1.5	-	-	-1.5
Pincrest Beds	27.35	-82.43	-	0.0	0.0	0.0	-	-	0.0
Cayo Aqua	9.15	-82.05	-	0.0	1.1	0.6	-	-	0.6
SEFlor(G-182)	25.78	-80.28	-	-2.0	0.4	-0.8	-	-	-0.8
DSDP 502	11.49	-79.38	3051.0	1.0	0.0	0.5	-	-	0.5
Duplin	34.00	-79.00	-	-0.7	-0.4	-0.6	-	-	-0.6
Lee Creek	35.38	-76.75	-	2.3	3.1	2.7	-	-	2.7
Yorktown	37.00	-76.50	-	5.2	1.8	3.5	-	-	3.5
ODP 1237	-16.00	-76.37	3212.3	5.3	5.5	5.4	0.1	3.0	5.4
DSDP 603	35.49	-70.03	4633.0	5.3	0.5	2.9	-	-0.6	2.9
DSDP 541 <sup>a</sup>	15.52	-58.72	4940.0	1.2	-0.9	0.2	-3.0	-	0.2
ODP 672 <sup>a</sup>	15.50	-58.50	4982.5	1.2	-0.9	0.2	-3.0	-	0.2
ODP 646	58.25	-48.33	3440.3	1.5	2.2	1.8	-	-	1.8
DSDP 396	22.90	-43.50	4459.0	1.3	1.1	1.2	-	-	1.2
ODP 695	-62.39	-43.45	1300.1	4.7	-	-	-	-	3.7
DSDP 606	37.34	-35.50	3007.0	1.1	1.3	1.2	4.7	1.5	1.2
DSDP 516	-30.27	-35.28	1313.0	2.0	2.0	2.0	-	-	2.0
DSDP 607	41.00	-32.96	3427.0	0.0	-0.3	-0.2	1.9	1.4	-0.2
ODP 699	-51.54	-30.68	3705.5	2.0	-	-	-	-	-0.2
DSDP 410	45.51	-29.48	2976.0	2.8	5.8	4.3	-	-	4.3
DSDP 609	49.88	-24.24	3883.5	9.0	12.0	10.5	0.1	3.4	5.4
DSDP 552	56.04	-23.23	2301.0	3.3	7.8	5.5	3.1	5.3	5.5
DSDP 608	42.84	-23.09	3526.0	4.1	4.9	4.5	-	-	4.5
ODP 667	4.55	-21.90	3524.9	-0.1	0.0	0.0	-	-	0.0
ODP 659	18.08	-21.03	3071.7	1.3	3.2	2.3	-	-	2.3
DSDP 366	5.68	-19.85	2853.0	0.5	0.4	0.5	-	-	0.5
ODP 661	9.45	-19.39	4012.9	2.3	-0.2	1.1	-	-	1.1
DSDP 610	53.22	-18.89	2426.3	3.7	9.4	6.5	-	-	6.5
Tjornes	66.16	-17.25	-	4.0	6.2	5.1	-	-	5.1
ODP 693	-70.83	-14.57	2359.0	5.2	-	-	-	-	4.0
ODP 907	69.25	-12.70	1801.2	-	-	-	8.5	-	8.5
DSDP 548	48.85	-12.00	1251.0	7.0	10.4	8.7	-	-	8.7
DSDP 521	-26.07	-10.27	4127.5	2.0	2.0	2.0	-	-	2.0
DSDP 546	33.80	-9.60	3958.0	2.4	1.8	2.1	-	-	2.1
ODP 690	-65.16	1.21	2914.0	4.9	-	-	-	-	2.9
North Sea	52.50	1.50	-	4.7	0.4	2.6	-	-	2.6
ODP 909	78.58	3.07	2518.6	-	-	-	-	12.4	9.4
ODP 704	-46.88	7.42	2532.3	2.5	2.5	2.5	-	-	2.5
PS1448	-58.64	7.92	4970.0	3.0	-	-	-	-	2.6
ODP 911	80.47	8.23	901.5	-	-	-	-	18.1	12.2
DSDP 532	-19.74	10.52	1331.0	1.8	1.8	1.8	-	-	1.8
DSDP 132	40.25	11.43	2835.0	1.6	1.6	1.6	-	-	1.6
Punta di Maiata	37.33	13.50	-	2.9	-4.5	-0.8	-	-	-0.8
Punta Piccola	37.33	13.58	-	4.2	-1.9	1.2	-	-	1.2
Finikia	35.25	25.17	-	0.7	-4.4	-1.8	-	-	-1.8
ODP 722	16.62	59.80	2022.1	1.1	2.3	1.7	-	-	1.7
ODP 736	-49.40	71.66	628.7	3.0	-	-	-	-	-0.5
ODP 747	-54.81	76.79	1695.8	2.1	-	-	-	-	0.7
ODP 748	-58.44	78.98	1289.6	3.2	-	-	-	-	2.7
ODP 751	-57.73	79.81	1633.8	2.9	-	-	-	-	2.4
ODP 745	-59.60	85.86	4082.5	2.9	-	-	-	-	2.2
DSDP 266	-56.40	110.11	4167.0	1.2	-	-	-	-	-0.6
ODP 769	8.78	121.29	3644.0	0.0	0.5	0.3	-	-	0.2
DSDP 445	25.52	133.20	3377.0	2.0	1.0	1.5	0.3	-	1.5
Yabuta	37.00	137.00	-	0.0	0.0	0.0	-	-	0.0
Sasaoka	39.50	140.50	-	1.5	2.0	1.8	-	-	1.8
E50-28	-62.90	150.68	3489.0	3.1	-	-	-	-	2.0
E36-33	-57.75	150.88	3952.0	1.0	-	-	-	-	-0.5
DSDP 579	38.63	153.84	5737.0	5.5	4.4	5.0	-	-	5.0
DSDP 580	41.63	153.98	5375.0	6.2	3.3	4.8	-	-	4.8
DSDP 586	-0.50	158.50	2207.0	0.0	0.0	0.0	-	-	0.0
ODP 806	0.31	159.36	2520.5	-0.2	-0.7	-0.4	0.4	-	0.0
ODP 881	47.10	161.49	5530.9	1.9	3.8	2.9	-	-	2.9
E. Kamchatka	56.00	163.00	-	4.0	-0.5	1.8	-	-	1.8
Karaginsky	58.85	164.04	-	4.0	2.0	3.0	-	-	3.0
DSDP 592	-36.47	165.44	1088.0	2.0	2.0	2.0	-	-	2.0
ODP 883	51.20	167.77	2390.8	0.5	4.5	2.5	-	-	2.5
E50-33	-61.09	170.06	4550.0	0.5	-	-	-	-	-0.6
DSDP 274	-68.99	173.43	3305.0	5.0	-	-	-	-	3.6
Rangitikei R.	-39.50	175.87	-	2.0	2.0	2.0	-	-	2.0

<sup>a</sup> Data from Sites 541 and 672 were combined into one time series.