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Biogeographic distribution of diversity and size-structure of organic-walled dinoflagellate cysts

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Table S1. Estimated largest cross-sectional area (μm^2) of each dinoflagellate cyst species based on geometric shapes. Units for width, height, and length are in micrometers. Species with an asterisk are compressed in 1 dimension; therefore, only half of the pentagonal cross-sectional area was used to calculate area

Species	Shape	Median width (d_1)	Median height (d_3)	Median length (d_2)	Area formula	Area	Source
<i>Ataxiodinium choane</i>	Sphere	31.5			$(\pi/4) \cdot d_1^2$	779	Reid (1974), cited in Marret & Zonneveld (2003)
<i>Bitectatodinium spongium</i>	Sphere	55.5			$(\pi/4) \cdot d_1^2$	2419	Zonneveld & Jurkschat (1999), cited in Marret & Zonneveld (2003)
<i>Bitectatodinium tepikiense</i>	Sphere	53			$(\pi/4) \cdot d_1^2$	2206	Wilson (1973), cited in Marret & Zonneveld (2003)
<i>Brigantedinium cariacense</i>	Sphere	53.5			$(\pi/4) \cdot d_1^2$	2248	Reid (1977), cited in Marret & Zonneveld (2003)
<i>Brigantedinium simplex</i>	Sphere	41.5			$(\pi/4) \cdot d_1^2$	1353	Reid (1977), cited in Marret & Zonneveld (2003)

<i>Brigantedinium</i> spp.	Sphere	47.5		$(\pi/4) \cdot d_1^2$	1772	Reid (1977), cited in Marret & Zonneveld (2003)
Cyst of cf. <i>Scrippsiella trifida</i>	Sphere	40		$(\pi/4) \cdot d_1^2$	1257	Head et al. (2006)
<i>Dalella chathamensis</i>	Sphere	27		$(\pi/4) \cdot d_1^2$	573	McMinn & Sun (1994), cited in Marret & Zonneveld (2003)
<i>Dubridinium</i> spp.	Oval	39	46	$(\pi/4) \cdot d_1 \cdot d_2$	1385	Pospelova et al. (2002)
<i>Echinidinium aculeatum</i>	Sphere	21		$(\pi/4) \cdot d_1^2$	346	Zonneveld (1997), cited in Marret & Zonneveld (2003)
<i>Echinidinium</i> cf. <i>karaense</i>	Sphere	32.5		$(\pi/4) \cdot d_1^2$	830	Zonneveld (1997), cited in Marret & Zonneveld (2003)
<i>Echinidinium delicatum</i>	Sphere	21		$(\pi/4) \cdot d_1^2$	346	Zonneveld (1997), cited in Marret & Zonneveld (2003)
<i>Echinidinium granulatum</i>	Sphere	36		$(\pi/4) \cdot d_1^2$	1018	Zonneveld (1997), cited in Marret & Zonneveld (2003)
<i>Echinidinium transparatum</i>	Sphere	29		$(\pi/4) \cdot d_1^2$	661	Zonneveld (1997), cited in Marret & Zonneveld (2003)
Forma A	Oval	29.5	37.5	$(\pi/4) \cdot d_1 \cdot d_2$	869	Harland (1973)
<i>Gymnodinium catenatum</i>	Sphere	49		$(\pi/4) \cdot d_1^2$	1886	Bolch et al. (1999), cited in Marret & Zonneveld (2003)
<i>Gymnodinium nolleri</i>	Sphere	33		$(\pi/4) \cdot d_1^2$	855	Ellegaard et al. (1998)
<i>Impagidinium variaseptum</i>	Sphere	61		$(\pi/4) \cdot d_1^2$	2922	Marret & de Vernal (1997), cited in Marret & Zonneveld (2003)
<i>Impagidinium aculeatum</i>	Sphere	33		$(\pi/4) \cdot d_1^2$	855	Lentin & Williams (1981), cited in Marret & Zonneveld (2003)
<i>Impagidinium pallidum</i>	Sphere	58		$(\pi/4) \cdot d_1^2$	2642	Bujak (1984), cited in Marret & Zonneveld (2003)
<i>Impagidinium paradoxum</i>	Oval	26	31	$(\pi/4) \cdot d_1 \cdot d_2$	633	Stover & Evitt (1978), cited in Marret & Zonneveld (2003)

<i>Impagidinium patulum</i>	Oval	50	55	$(\pi/4) \cdot d_1 \cdot d_2$	2160	Stover & Evitt (1978), cited in Marret & Zonneveld (2003)
<i>Impagidinium plicatum</i>	Oval	28	38	$(\pi/4) \cdot d_1 \cdot d_2$	836	Versteegh & Zevenboom (1995), cited in Marret & Zonneveld (2003)
<i>Impagidinium sphaericum</i>	Sphere	49		$(\pi/4) \cdot d_1^2$	1886	Lentin & Williams (1981), cited in Marret & Zonneveld (2003)
<i>Impagidinium</i> spp.	Sphere	37		$(\pi/4) \cdot d_1^2$	1075	Stover & Evitt (1978), cited in Marret & Zonneveld (2003)
<i>Impagidinium strialatum</i>	Oval	29	36	$(\pi/4) \cdot d_1 \cdot d_2$	820	Stover & Evitt (1978), cited in Marret & Zonneveld (2003)
<i>Impagidinium velorum</i>	Oval	47	53	$(\pi/4) \cdot d_1 \cdot d_2$	1956	Bujak (1984), cited in Marret & Zonneveld (2003)
<i>Islandinium brevispinosum</i>	Sphere	20		$(\pi/4) \cdot d_1^2$	314	Pospelova & Head (2002)
<i>Islandinium? cezare</i>	Sphere	25		$(\pi/4) \cdot d_1^2$	491	Head et al. (2001), cited in Marret & Zonneveld (2003)
<i>Islandinium minutum</i>	Sphere	41.5		$(\pi/4) \cdot d_1^2$	1353	Head et al. (2001), cited in Marret & Zonneveld (2003)
<i>Leipokatium invisitatum</i>	Peridinoid	58.5	43.5	$d_1 \cdot (d_3/2)$	1272	Bradford (1975), cited in Marret & Zonneveld (2003)
<i>Lejeunecysta oliva</i> *	Pentagon	73	81	$(\pi/8) \cdot d_1 \cdot d_2$	2322	Reid (1977)
<i>Lejeunecysta sabrina</i> *	Pentagon	69.5	68	$(\pi/8) \cdot d_1 \cdot d_2$	1856	Reid (1977)
<i>Lingulodinium machaerophorum</i>	Sphere	42.5		$(\pi/4) \cdot d_1^2$	1419	Wall (1967), cited in Marret & Zonneveld (2003)
<i>Nematosphaeropsis labyrinthus</i>	Oval	27	42	$(\pi/4) \cdot d_1 \cdot d_2$	891	Reid (1974), cited in Marret & Zonneveld (2003)
<i>O. centrocarpum</i> sensu Wall & Dale 1966—short processes	Sphere	40.5		$(\pi/4) \cdot d_1^2$	1288	Wall & Dale (1966), cited in Marret & Zonneveld (2003)

<i>Operculodinium centropurum</i>	Sphere	40.5		$(\pi/4) \cdot d_1^2$	1288	Wall & Dale (1966), cited in Marret & Zonneveld (2003)
<i>Operculodinium israelianum</i>	Sphere	40.5		$(\pi/4) \cdot d_1^2$	1288	Wall (1967), cited in Marret & Zonneveld (2003)
<i>Operculodinium janduchenei</i>	Sphere	32.5		$(\pi/4) \cdot d_1^2$	830	Head et al. (1989), cited in Marret & Zonneveld (2003)
<i>Pentapharsodinium dalei</i>	Sphere	27.5		$(\pi/4) \cdot d_1^2$	594	Indelicato & Loeblich (1986), cited in Marret & Zonneveld (2003)
<i>Polykrikos cf. kofoidii</i>	Oval	43.5	63.5	$(\pi/4) \cdot d_1 \cdot d_2$	2169	Chatton (1914), cited in Marret & Zonneveld (2003)
<i>Polykrikos kofoidii</i>	Oval	43.5	63.5	$(\pi/4) \cdot d_1 \cdot d_2$	2169	Chatton (1914), cited in Marret & Zonneveld (2003)
<i>Polykrikos schwartzii</i>	Oval	54.5	80	$(\pi/4) \cdot d_1 \cdot d_2$	3424	Bütschli (1873), cited in Marret & Zonneveld (2003)
<i>Polysphaeridium zoharyi</i>	Sphere	49		$(\pi/4) \cdot d_1^2$	1886	Bujak et al. (1980), cited in Marret & Zonneveld (2003)
<i>Pyxidinoopsis reticulata</i>	Sphere	34		$(\pi/4) \cdot d_1^2$	908	Wall & Dale (1968), cited in Marret & Zonneveld (2003)
<i>Protoperidinium americanum</i>	Sphere	43.5		$(\pi/4) \cdot d_1^2$	1486	Balech (1974), cited in Marret & Zonneveld (2003)
<i>Protoperidinium claudicans</i>	Pyriiform	61.5	61.5	$(\pi/4) \cdot d_1 \cdot d_2$	2971	Wall & Dale (1968), cited in Marret & Zonneveld (2003)
<i>Protoperidinium compressum*</i>	Pentagon	60.5	62.5	$(\pi/8) \cdot d_1 \cdot d_2$	1485	Abe (1927)
<i>Protoperidinium conicoides</i>	Oval	58.5	54	$(\pi/4) \cdot d_1 \cdot d_2$	2481	Wall & Dale (1968), cited in Marret & Zonneveld (2003)
<i>Protoperidinium nudum</i>	Oval	48	39	$(\pi/4) \cdot d_1 \cdot d_2$	1470	Balech (1974), cited in Marret & Zonneveld (2003)
<i>Protoperidinium pentagonum*</i>	Pentagon	72	76	$(\pi/8) \cdot d_1 \cdot d_2$	2149	Wall & Dale (1968), cited in Marret & Zonneveld (2003)

<i>Protoperidinium stellatum*</i>	Pentagon	35	38.5	$(\pi/8) \cdot d_1 \cdot d_2$	529	Rochon et al. (1999), cited in Marret & Zonneveld (2003)
<i>Quinquecuspis concreta*</i>	Pentagon	70	72.5	$(\pi/8) \cdot d_1 \cdot d_2$	1993	Reid (1977)
<i>Selenopemphix alticinctum</i>	Oval	32.5	27.5	$(\pi/4) \cdot d_1 \cdot d_2$	702	Harland (1973)
<i>Selenopemphix antarctica</i>	Sphere	71		$(\pi/4) \cdot d_1^2$	3959	Marret & de Vernal (1997), cited in Marret & Zonneveld (2003)
<i>Selenopemphix nephroides</i>	Sphere	54		$(\pi/4) \cdot d_1^2$	2290	Benedek & Sarjeant (1981), cited in Marret & Zonneveld (2003)
<i>Selenopemphix quanta</i> s.l.	Sphere	61.5		$(\pi/4) \cdot d_1^2$	2971	Matsuoka (1985), cited in Marret & Zonneveld (2003)
<i>Spiniferites belerius</i>	Oval	32.5	38.5	$(\pi/4) \cdot d_1 \cdot d_2$	983	Reid (1974), cited in Marret & Zonneveld (2003)
<i>Spiniferites bentorii</i>	Oval	55	62	$(\pi/4) \cdot d_1 \cdot d_2$	2678	Wall & Dale (1970), cited in Marret & Zonneveld (2003)
<i>Spiniferites bulloideus</i>	Oval	30	36.5	$(\pi/4) \cdot d_1 \cdot d_2$	860	Rossignol (1964), cited in Marret & Zonneveld (2003)
<i>Spiniferites delicatus</i>	Oval	37.5	57	$(\pi/4) \cdot d_1 \cdot d_2$	1679	Reid (1974), cited in Marret & Zonneveld (2003)
<i>Spiniferites elongatus</i>	Oval	33	50.5	$(\pi/4) \cdot d_1 \cdot d_2$	1309	Reid (1974), cited in Marret & Zonneveld (2003)
<i>Spiniferites frigidus</i>	Oval	34	68.5	$(\pi/4) \cdot d_1 \cdot d_2$	1829	Head et al. (2001), cited in Marret & Zonneveld (2003)
<i>Spiniferites lazus</i>	Oval	36.5	51	$(\pi/4) \cdot d_1 \cdot d_2$	1462	Reid (1974), cited in Marret & Zonneveld (2003)
<i>Spiniferites membranaceus</i>	Oval	43.5	47.5	$(\pi/4) \cdot d_1 \cdot d_2$	1623	Rossignol (1964), cited in Marret & Zonneveld (2003)
<i>Spiniferites mirabilis/hyperacanthus</i>	Oval	46	56	$(\pi/4) \cdot d_1 \cdot d_2$	2023	Rossignol (1964), cited in Marret & Zonneveld (2003)
<i>Spiniferites pachydermus</i>	Oval	35	49	$(\pi/4) \cdot d_1 \cdot d_2$	1347	Reid (1974), cited in Marret & Zonneveld (2003)

<i>Spiniferites ramosus</i>	Oval	30	32.5	$(\pi/4) \cdot d_1 \cdot d_2$	766	Lewis et al. (1999), cited in Marret & Zonneveld (2003)
<i>Spiniferites ramosus</i> — <i>granosus</i> type	Oval	42.5	35	$(\pi/4) \cdot d_1 \cdot d_2$	1168	Reid (1977)
<i>Spiniferites</i> spp.	Oval	40	50	$(\pi/4) \cdot d_1 \cdot d_2$	1571	Reid (1974), cited in Marret & Zonneveld (2003)
<i>Tectatodinium pellitum</i>	Sphere	42.5		$(\pi/4) \cdot d_1^2$	1419	Wall (1967), amended by Head (1994), cited in Marret & Zonneveld (2003)
<i>Tectatodinium</i> spp.	Oval	31	26.5	$(\pi/4) \cdot d_1 \cdot d_2$	645	Matsuoka & Head (1992)
<i>Trinovantedinium applanatum</i>	Sphere	67		$(\pi/4) \cdot d_1^2$	3526	Bujak & Davies (1983), cited in Marret & Zonneveld (2003)
<i>Trinovantedinium variabile</i>	Oval	53	53.5	$(\pi/4) \cdot d_1 \cdot d_2$	2206	Bujak (1984)
<i>Tuberculodinium vancampoae</i>	Oval	52.5	95	$(\pi/4) \cdot d_1 \cdot d_2$	3917	Wall (1967), cited in Marret & Zonneveld (2003)
<i>Votadinium calvum</i>	Oval	59	71	$(\pi/4) \cdot d_1 \cdot d_2$	3290	Reid (1977)
<i>Votadinium spinosum</i> *	Peridinoïd	58.5	51.5	$(\pi/8) \cdot d_1 \cdot d_2$	1183	Reid (1977), cited in Marret & Zonneveld (2003)
<i>Xandarodinium xanthum</i>	Oval	47	54.5	$(\pi/4) \cdot d_1 \cdot d_2$	2012	Reid (1977), cited in Marret & Zonneveld (2003)

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