

Algeo et al., Icehouse-greenhouse variations in marine denitrification

Table 1. N-isotope and correlative data for 153 marine units from 660 Ma to Recent

Record	SOURCE	LOCATION	FORMATION	SETTING	PERIOD	SERIES	AGE			SAMPLE n
							start (Ma)	end (Ma)	mid (Ma)	
1	Meyers (unpublished)	California margin (ODP 1014)	unnamed	upwelling	Ng	Pleistocene	1.93	2.26	2.10	84
2	Robinson & Meyers, 2002	Namibian Shelf (ODP 1082-108)	unnamed	upwelling	Ng	Pleistocene	1.95	2.45	2.20	195
3	Macko & Pereira, 1990	Antarctic margin (ODP 693)	unnamed	oceanic	Ng	Pleistocene	2.60	1.80	2.20	60
4	Muzuka et al., 1991	Oman margin	unnamed	upwelling	Ng	Pleistocene	3.00	1.80	2.40	254
5	Arnaboldi & Meyers, 2006	Mediterranean (974C)	unnamed	oceanic-med	Ng	Pleistocene	3.00	2.00	2.50	97
6	Arnaboldi & Meyers, 2006	Mediterranean (969D)	unnamed	oceanic-med	Ng	Pleistocene	3.00	2.00	2.50	93
7	Arnaboldi & Meyers, 2006	Mediterranean (967B)	unnamed	oceanic-med	Ng	Pleistocene	3.00	2.00	2.50	50
8	Li & Bebout, 2006	Costa Rica margin (ODP 170)	unnamed	oceanic	Ng	Plio-Pleistocene	5.30	0.00	2.65	52
9	Pedersen (unpublished)	Mediterranean (969B)	unnamed	oceanic-med	Ng	Pliocene	3.06	3.05	3.06	24
10	Liu et al., 2008	E Trop Pacific (ODP 1012)	unnamed	upwelling	Ng	Pliocene	4.10	2.10	3.10	721
11	Struck et al., 2001	Mediterranean	unnamed	oceanic-med	Ng	Pliocene	5.00	2.00	3.50	49
12	Li & Bebout, 2006	Costa Rica margin (ODP 205)	unnamed	oceanic	Ng	Pliocene	5.30	1.80	3.55	13
13	Macko & Pereira, 1990	Antarctic margin (ODP 694)	unnamed	oceanic	Ng	Pliocene	5.30	1.80	3.55	82
14	Macko & Pereira, 1990	Antarctic margin (ODP 690)	unnamed	oceanic	Ng	Pliocene	5.30	1.80	3.55	40
15	Macko & Pereira, 1990	Antarctic margin (ODP 693)	unnamed	oceanic	Ng	IPliocene	5.30	2.60	3.95	53
16	Sadofsky & Bebout, 2004	western Pacific (ODP 1149)	unnamed	oceanic	Ng	uMio-Pliocene	6.50	2.00	4.25	11
17	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Ng	Pliocene	5.30	4.00	4.65	29
18	Macko & Pereira, 1990	Antarctic margin (ODP 693)	unnamed	oceanic	Ng	uMiocene	11.61	5.30	8.46	49
19	Macko & Pereira, 1990	Antarctic margin (ODP 694)	unnamed	oceanic	Ng	uMiocene	11.61	5.30	8.46	71
20	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Ng	uMiocene	11.61	7.20	9.41	22
21	Macko & Pereira, 1990	Antarctic margin (ODP 690)	unnamed	oceanic	Ng	uMiocene	11.61	9.01	10.31	15
22	Calvert, 2000	California	Monterey	upwelling	Ng	Miocene	13.51	9.51	11.51	23
23	Hudson et al., 2008 & Rowe (unpubl.)	Azerbaijan	post-Maikop	oceanic-med	Ng	mMiocene	14.82	12.51	13.67	17
24	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Ng	mMiocene	16.02	11.61	13.82	19
25	Macko & Pereira, 1990	Antarctic margin (ODP 694)	unnamed	oceanic	Ng	mMiocene	16.02	11.61	13.82	86
26	Macko & Pereira, 1990	Antarctic margin (ODP 690)	unnamed	oceanic	Ng	mMiocene	16.02	11.61	13.82	13
27	Macko & Pereira, 1990	Antarctic margin (ODP 693)	unnamed	oceanic	Ng	mMiocene	18.02	13.61	15.82	25
28	Macko & Pereira, 1990	Antarctic margin (ODP 690)	unnamed	oceanic	Ng	lMiocene	18.42	16.52	17.47	4
29	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Ng	lMiocene	19.42	16.02	17.72	9
30	Hudson et al., 2008 & Rowe (unpubl.)	Azerbaijan	Maikop Series	oceanic-med	Ng	lMiocene	23.03	14.82	18.93	22
31	Macko & Pereira, 1990	Antarctic margin (ODP 693)	unnamed	oceanic	Ng	lMiocene	23.03	18.02	20.53	10
32	Hudson et al., 2008 & Rowe (unpubl.)	Azerbaijan	Maikop Series	oceanic-med	Pg	uOligocene	28.37	23.03	25.70	62
33	Macko & Pereira, 1990	Antarctic margin (ODP 693)	unnamed	oceanic	Pg	uOligocene	28.47	23.03	25.75	11
34	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Pg	uOligocene	28.37	24.22	26.30	12

35	Macko & Pereira, 1990	Antarctic margin (ODP 690)	unnamed	oceanic	Pg	uOligocene	28.17	25.01	26.59	11
36	Macko & Pereira, 1990	Antarctic margin (ODP 693)	unnamed	oceanic	Pg	lOligocene	31.92	29.95	30.94	24
37	Hudson et al., 2008 & Rowe (unpubl.)	Azerbaijan	Maikop Series	oceanic-med	Pg	lOligocene	33.90	28.37	31.14	53
38	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Pg	lOligocene	33.90	28.37	31.14	11
39	Schulz et al., 2002	Austria	Schoeneck	epeiric	Pg	Oligocene	34.41	31.43	32.92	50
40	Hudson et al., 2008 & Rowe (unpubl.)	Azerbaijan	Koun Fm	oceanic-med	Pg	uEocene	37.14	33.90	35.52	75
41	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Pg	uEocene	37.14	33.90	35.52	16
42	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Pg	mEocene2	40.39	37.14	38.77	8
43	Hudson et al., 2008 & Rowe (unpubl.)	Azerbaijan	Koun Fm	oceanic-med	Pg	mEocene	48.70	37.14	42.92	52
44	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Pg	mEocene1	48.70	40.39	44.55	16
45	Sadofsky & Bebout, 2003	California	Franciscan	oceanic	Pg	Eocene	56.21	33.90	45.06	7
46	Meyers (unpublished)	Arctic Ocean (ACES)	unnamed	oceanic-med	Pg	Eocene	47.08	45.05	46.07	11
47	Sadofsky & Bebout, 2004	western Pacific (ODP 1149)	unnamed	oceanic	Pg	Paleoc-Eocene	66.00	33.90	49.95	3
48	Hudson et al., 2008 & Rowe (unpubl.)	Azerbaijan	Koun Fm	oceanic-med	Pg	lEocene	56.00	48.70	52.35	41
49	Macko & Pereira, 1990	Antarctic margin (ODP 689)	unnamed	oceanic	Pg	lEocene	54.18	52.76	53.47	6
50	Hudson et al., 2008 & Rowe (unpubl.)	Azerbaijan	Koun Fm	oceanic-med	Pg	Paleocene	66.00	56.00	61.00	30
51	Meyers et al., 2009	Demerara (ODP 1257-61)	unnamed	oceanic	Pg	Paleocene	66.00	63.42	64.71	2
52	Martinez-Ruiz et al. 1994	Spain	Agost section	shelf	K/T	Maas-Paleocene	66.50	65.50	66.00	12
53	Meyers et al., 2009	Demerara (ODP 1257-61)	unnamed	oceanic	Cret	Camp-Maas	83.60	66.00	74.80	9
54	Sadofsky & Bebout, 2004	western Pacific (ODP 1149)	unnamed	oceanic	Cret	Campanian	83.60	72.10	77.85	3
55	Meyers et al., 2009	Demerara (ODP 1257-61)	unnamed	oceanic-med	Cret	Santonian	86.30	83.60	84.95	4
56	Junium & Arthur, 2007	Atlantic (ODP 1261)	unnamed	oceanic-med	Cret	Coniac-Santon	90.00	85.95	87.98	23
57	Meyers et al., 2009	Demerara (ODP 1257-61)	unnamed	oceanic-med	Cret	Coniacian	89.80	86.30	88.05	5
58	Meyers et al., 2009	ODP 1138 Kerguelen	unnamed	oceanic	Cret	uTuron-Santon	91.95	84.19	88.07	27
59	Arnaboldi & Meyers, 2006	Newfoundland (ODP 1276)	unnamed	oceanic-med	Cret	Turonian	93.41	89.80	91.61	5
60	Meyers et al., 2009	Demerara (ODP 1257-61)	unnamed	oceanic-med	Cret	Turonian	93.90	89.80	91.85	16
61	Jenkyns et al., 2007	Morocco	unnamed	upwelling	Cret	Turonian	93.90	91.46	92.68	46
62	Junium & Arthur, 2007	Atlantic (ODP 1261)	unnamed	oceanic-med	Cret	Cenom-Turon	96.06	90.00	93.03	44
63	Arnaboldi & Meyers, 2006	Newfoundland (ODP 1276)	unnamed	oceanic-med	Cret	Cenom-Turon	94.44	93.41	93.93	6
64	Jenkyns et al., 2007	England	unnamed	epeiric	Cret	Cenom-Turon	94.44	93.90	94.17	13
65	Jenkyns et al., 2007	Italy-Furlo	Scaglia Bianca	oceanic-med	Cret	Cenom-Turon	94.44	93.90	94.17	28
66	Jenkyns et al., 2007	Italy-Gubbio	Scaglia Bianca	oceanic-med	Cret	Cenom-Turon	94.44	93.90	94.17	49
67	Kuypers et al., 2004	Atlantic (DSDP 367)	unnamed	oceanic-med	Cret	Cenomanian	94.44	93.90	94.17	17
68	Ohkouchi et al., 2006	Italy	Livello Bonarelli	oceanic-med	Cret	Cenom-Turon	94.44	93.90	94.17	23
69	Junium & Arthur, 2007	Atlantic (ODP 1260)	unnamed	oceanic-med	Cret	Cenom-Turon	96.06	92.92	94.49	56
70	Ohkouchi et al., 2006	Italy	Scaglia Bianca	oceanic-med	Cret	Cenom	94.98	94.44	94.71	21
71	Jenkyns et al., 2007	Morocco	unnamed	upwelling	Cret	Cenom	96.60	93.90	95.25	74
72	Meyers et al., 2009	ODP 1138 Kerguelen	unnamed	oceanic	Cret	Cenom-lTuron	99.85	91.95	95.90	16
73	Arnaboldi & Meyers, 2006	Newfoundland (ODP 1276)	unnamed	oceanic-med	Cret	Cenomanian	99.85	94.44	97.15	4
74	Meyers et al., 2009	Demerara (ODP 1257-61)	unnamed	oceanic-med	Cret	Cenomanian	100.50	93.90	97.20	46
75	Rau et al., 1987	South Atlantic (DSDP 530)	unnamed	oceanic-med	Cret	Aptian-Santon	111.99	85.36	98.68	12
76	Arnaboldi & Meyers, 2006	Newfoundland (ODP 1276)	unnamed	oceanic-med	Cret	Albian-Cenom	101.91	99.85	100.88	5

77	Rigby & Batts, 1986	Australia	Toolebuc	epeiric	Cret	Albian	106.95	103.93	105.44	5
78	Meyers et al., 2009	Demerara (ODP 1257-61)	unnamed	oceanic-med	Cret	Albian	113.00	100.50	106.75	9
79	Sadofsky & Bebout, 2003	Baja California	unnamed	oceanic	Cret	uncertain			107.46	5
80	Arnaboldi & Meyers, 2006	Newfoundland (ODP 1276)	unnamed	oceanic-med	Cret	uAptian-Albian	114.02	101.91	107.97	21
81	Kuypers et al., 2002	North Atlantic (ODP 1049C)	unnamed	oceanic-med	Cret	Albian	111.99	111.49	111.74	6
82	Kuypers et al., 2004	Atlantic (Cismon)	unnamed	oceanic-med	Cret	Aptian	125.28	124.25	124.77	32
83	Rau et al., 1987	North Atlantic (DSDP 603)	unnamed	oceanic-med	Cret	Valang-Barrem	137.66	128.10	132.88	11
84	Rau et al., 1987	North Atlantic (DSDP 367)	unnamed	oceanic-med	Cret	Valang-Hauter	136.22	131.77	134.00	11
85	Saelen et al. 2000	England	Kimmeridge Cl	epeiric	Jur	Kimmeridge	155.50	152.31	153.91	13
86	Jenkyns et al., 2001	Wales-MFB	Whitby Mudst	epeiric	Jur	Toarcian	182.70	176.89	179.80	71
87	Jenkyns et al., 2001	England-WKB	Whitby Mudst	epeiric	Jur	Toarcian	182.70	179.21	180.96	33
88	Saelen et al. 2000	England	Whitby Mudst	epeiric	Jur	Toarcian	182.70	180.38	181.54	15
89	Jenkyns et al., 2001	England-HB	Whitby Mudst	epeiric	Jur	Toarcian	182.70	180.38	181.54	89
90	Jenkyns et al., 2001	Italy	unnamed	epeiric	Jur	Toarcian	182.70	180.38	181.54	74
91	Jenkyns et al., 2001	England-WKB	Whitby Mudst	epeiric	Jur	Pliensbachian	185.15	182.70	183.93	10
92	Quan et al., 2008	Germany	Lower Jurassic	epeiric	Jur	Hettang-Sinemur			199.62	18
94	Paris et al., 2010	England	Blue Lias	shelf	Jur	Hettangian			200.91	44
93	Sephton et al., 2002	Canada-Western	Fernie	epeiric	Jur	Hettangian	202.12	200.27	201.20	3
95	Paris et al., 2010	England	Lilstock	epeiric	Tri	Rhaetian			204.17	20
96	Quan et al., 2008	Germany	Keuper shales	epeiric	Tri	Rhaetian			204.17	32
97	Sephton et al., 2002	Canada-Western	Pardonet	shelf	Tri	Rhaetian	210.09	202.12	206.11	6
98	Sephton et al., 2002	Canada-Western	Pardonet	shelf	Tri	Norian	227.67	210.09	218.88	8
99	Chicarelli et al., 1993	Switzerland	Scisti bituminos	epeiric	Tri	Anisian-Ladinian	242.20	241.00	241.60	4
100	Algeo & Rowe (unpublished)	Switzerland	Scisti bituminos	epeiric	Tri	Anisian-Ladinian	242.20	241.00	241.60	3
101	Algeo, Krystyn & Rowe (unpublished)	India-Spiti	Mikin	shelf	Tri	Olenekian	251.28	248.76	250.02	70
102	Algeo, Krystyn & Rowe (unpublished)	India-Spiti	Mikin	shelf	Tri	Induan	252.20	251.28	251.74	43
103	Algeo et al., 2007	India-Kashmir	Khunamuh	shelf	Tri	Induan	252.20	251.28	251.74	9
104	Algeo et al., 2012	Canada-Arctic	Blind Fiord	shelf	Tri	Induan	252.20	251.28	251.74	44
105	Algeo & Rowe (unpublished)	China-East	Yinkeng	shelf	Tri	Induan	252.20	251.74	251.97	30
106	Algeo & Rowe (unpublished)	China-East	Dalong	shelf	Perm	Lopingian	252.56	252.20	252.38	12
107	Algeo et al., 2012	Canada-Arctic	Van Hauen	shelf	Perm	Lopingian	252.56	252.20	252.38	11
108	Algeo et al., 2007	India-Kashmir	Zewan	shelf	Perm	Lopingian	252.91	252.20	252.56	8
109	Algeo, Krystyn & Rowe (unpublished)	India-Spiti	Kuling	shelf	Perm	Lopingian	252.91	252.20	252.56	22
110	Algeo & Rowe (unpublished)	Kansas	Eudora	epeiric	Penn	Missourian	303.31	302.82	303.07	83
111	Algeo & Rowe (unpublished)	Kansas	Wea	epeiric	Penn	Missourian	303.83	303.31	303.57	34
112	Algeo et al., 2008	Kansas	Muncie Creek	epeiric	Penn	Missourian	304.46	303.83	304.15	42
113	Algeo et al., 2008	Kansas	Stark	epeiric	Penn	Missourian	305.73	305.10	305.42	37
114	Algeo et al., 2008	Kansas	Hushpuckney	epeiric	Penn	Missourian	306.37	305.73	306.05	45
115	Rowe (unpublished)	Texas	Smithwick	shelf	Penn	Atokan	310.94	307.00	308.97	149
116	Johnson et al., 2009	Alaska	Lisburne (shallc	shelf	Miss	unknown	338.09	319.33	328.71	9
117	Rowe (unpublished)	Texas (Blakely-Wise Co)	Barnett	shelf	Miss	Visean	337.25	323.08	330.17	128
118	Rowe (unpublished)	Texas (RTC-Pecos Co)	Barnett	shelf	Miss	Visean	337.25	323.08	330.17	177

119	Rowe (unpublished)	Texas (Johanson-McCulloch Cr	Barnett	shelf	Miss	Visean	337.25	323.08	330.17	24
120	Rowe (unpublished)	Texas (Lee-Brown Co)	Barnett	shelf	Miss	Visean	337.25	323.08	330.17	36
121	Rowe (unpublished)	Texas (Locker-San Saba Co)	Barnett	shelf	Miss	Visean	337.25	323.08	330.17	99
122	Johnson et al., 2009	Alaska	Lisburne-Kuna	shelf	Miss	Tourn-Visean	350.83	330.53	340.68	17
123	Algeo & Sauer (unpublished)	Ohio-Kentucky	Sunbury	epeiric	Miss	Tournaisian	358.72	356.97	357.85	40
124	Caplan & Bustin 1998	Alberta	Exshaw	epeiric	Miss	Tournaisian	359.60	357.85	358.73	21
125	Algeo & Sauer (unpublished)	Ohio-Kentucky	Ohio Shale	epeiric	Dev	Famennian	362.20	360.46	361.33	20
126	Meyers (unpublished)	Alberta	Exshaw	epeiric	Dev	Famennian	362.20	360.46	361.33	28
127	Caplan & Bustin 1998	Alberta	Exshaw	epeiric	Dev	Famennian	362.20	360.46	361.33	16
128	Calvert et al., 1996	Indiana	New Albany	epeiric	Dev	Famennian	369.16	368.29	368.73	71
129	de la Rue et al., 2007	Indiana	New Albany	epeiric	Dev	Famennian	372.20	371.77	371.99	10
130	Levman & von Bitter, 2002	Ontario	Long Rapids	epeiric	Dev	Frasn-Famen	373.66	370.90	372.28	24
131	de la Rue et al., 2007	Indiana	New Albany	epeiric	Dev	Frasnian	372.69	372.20	372.45	20
132	Sageman (unpublished)	New York	Geneseo-Rhine	epeiric	Dev	Frasnian	382.41	375.60	379.01	16
133	Sageman (unpublished)	New York	upper Hamilton	epeiric	Dev	Givetian	387.90	382.41	385.16	46
134	Sageman (unpublished)	New York	Marcellus	epeiric	Dev	Eifelian	390.84	387.90	389.37	58
135	Bauersachs et al., 2009	Poland	Bardo/Lwr Graç	epeiric	Sil	Llandov	440.80	433.11	436.96	8
136	LaPorte et al., 2009	Nevada-Monitor Range	unnamed	epeiric	Ord	Katian-Hirnant	446.65	443.80	445.23	68
137	LaPorte et al., 2009	Nevada-Vinini Creek	unnamed	epeiric	Ord	Katian-Hirnant	447.80	443.80	445.80	116
138	Algeo, Lev & Rowe (unpublished)	Wales	Llandeilo-Carac	epeiric	Ord	Sandbian	458.52	455.33	456.93	41
139	Algeo, Lev & Rowe (unpublished)	Wales	Caerhys Shale	epeiric	Ord	Daping-Darriwill.	462.23	459.76	461.00	23
140	Algeo, Lev & Rowe (unpublished)	Wales	Aber Mawr Sha	epeiric	Ord	Dapingian	465.94	463.47	464.71	28
141	Algeo & Rowe (unpublished)	Germany	Lwr Didymogra	epeiric	Ord	Floian	473.62	470.23	471.93	1
142	Algeo & Rowe (unpublished)	Utah	Wheeler	epeiric	Cam	Delam-Marjum	503.00	502.00	502.50	18
143	Jiang (unpublished)	China	Shuijingtuo	epeiric	Cam	Tommotian	522.24	517.83	520.04	9
144	Jiang (unpublished)	China	Yanjiahe	epeiric	Cam	Nemakit-Daldyniar	541.00	522.24	531.62	76
145	Jiang (unpublished)	China	Dengying (BMT	epeiric	Neopr		545.00	541.00	543.00	2
146	Jiang (unpublished)	China	Dengying (SBT	epeiric	Neopr		548.00	545.00	546.50	24
147	Jiang (unpublished)	China	Dengying (HMJ	epeiric	Neopr		551.00	548.00	549.50	7
148	Algeo & Rowe (unpublished)	China	Doushantuo (M	epeiric	Neopr		560.00	551.00	555.50	9
149	Jiang (unpublished)	China	Doushantuo (M	epeiric	Neopr		560.00	551.00	555.50	39
150	Jiang (unpublished)	China	Doushantuo (M	epeiric	Neopr		600.00	560.00	580.00	11
151	Jiang (unpublished)	China	Doushantuo (M	epeiric	Neopr		632.00	600.00	616.00	86
152	Jiang (unpublished)	China	Doushantuo (M	epeiric	Neopr		635.00	632.00	633.50	7
153	Jiang (unpublished)	China	Xiangmeng	epeiric	Neopr		663.00	654.00	658.50	34

Record	ELEMENTAL			MIN	C-ISOTOPES				MAX	MIN	N-ISOTOPES				MAX
	TOC (%)	N (%)	C:N (mol)		PERCENTILES			PERCENTILES							
					16th	50th	84th	16th			50th	84th			
1	6.06	0.48	14.90	-22.10	-21.70	-21.40	-21.10	-20.20	4.30	4.90	5.70	6.47	6.80		
2	5.01	0.36	16.20	-22.94	-21.70	-21.12	-20.35	-19.40	-0.24	0.79	1.77	2.98	3.80		
3	0.12	0.22	0.60	-24.60	-23.40	-22.90	-22.24	-21.00	1.00	2.94	4.25	5.90	7.30		
4	7.90			-23.00	-21.34	-20.50	-19.90	-18.60	3.40	5.40	6.60	7.90	14.00		
5	0.51	0.06	9.70	-26.03	-25.26	-24.30	-23.02	-22.22	0.07	2.29	4.47	5.19	5.81		
6	6.00	0.28	24.60	-25.92	-25.00	-23.83	-23.30	-21.39	-2.50	-1.84	0.18	4.64	6.23		
7				-23.23	-22.48	-22.05	-21.49	-20.66	-5.12	-2.30	0.07	4.04	5.15		
8	1.48	0.16	10.80	-26.30	-24.98	-24.00	-23.20	-22.50	3.50	3.82	4.55	5.97	6.60		
9	11.16								-2.72	-2.46	-1.67	3.97	4.93		
10	3.48	0.27	15.30						4.00	6.19	6.80	7.38	9.57		
11	3.70			-23.90	-23.40	-22.30	-21.15	-19.30	-1.10	0.28	1.30	2.05	4.10		
12	1.58	0.18	10.40	-26.60	-25.82	-24.80	-24.26	-21.50	3.60	4.09	4.30	5.61	6.00		
13	0.10	0.03	4.00	-24.50	-23.10	-22.50	-22.00	-21.20	2.20	3.10	3.80	4.40	4.90		
14	0.11	0.12	1.00	-27.00	-25.00	-24.00	-22.32	-20.60	2.00	3.82	5.00	6.18	7.40		
15	0.13	0.12	1.20	-26.00	-23.74	-23.10	-22.20	-21.60	1.00	2.90	3.80	4.50	6.10		
16	0.19	0.03	6.40	-24.50	-23.51	-23.10	-22.22	-21.70	4.70	4.92	5.50	5.74	6.30		
17	0.06	0.04	2.00	-27.20	-26.41	-25.60	-23.04	-19.70	1.10	1.70	2.40	3.70	5.60		
18	0.19	0.05	4.40	-26.70	-25.73	-24.30	-23.07	-22.10	2.20	2.90	3.60	4.60	5.00		
19	0.18	0.04	4.90	-26.10	-23.50	-22.70	-22.30	-21.70	2.40	3.16	4.30	4.70	6.70		
20	0.07	0.03	2.40	-28.50	-26.95	-24.70	-23.24	-21.10	1.50	2.48	3.15	3.99	4.70		
21	0.07	0.18	0.40	-29.40	-28.88	-27.30	-26.10	-23.60	3.00	3.62	5.00	6.54	8.70		
22	5.85	0.64	10.70	-22.93	-22.23	-21.55	-21.30	-19.83	1.50	4.96	6.60	7.50	14.00		
23	0.83	0.10	9.70	-27.01	-25.65	-24.05	-23.19	-20.65	-0.34	2.00	3.10	3.78	4.16		
24	0.07	0.03	3.40	-28.10	-27.70	-25.90	-24.69	-23.40	2.80	3.08	3.70	4.20	4.90		
25	0.37	0.05	9.30	-26.60	-23.60	-23.20	-22.70	-21.10	2.30	3.30	4.20	4.90	7.20		
26	0.06	0.22	0.30	-29.80	-29.62	-27.90	-26.77	-24.40	1.70	3.16	3.90	5.43	6.00		
27	0.16	0.05	3.40	-23.70	-23.42	-23.00	-22.60	-22.00	3.80	4.37	5.30	6.00	6.10		
28	0.07	0.17	0.50	-29.10	-28.81	-28.35	-27.94	-27.70	5.10	5.10	5.15	5.46	5.70		
29	0.04	0.03	1.60	-29.10	-28.70	-27.30	-26.86	-25.90	2.80	2.83	3.20	3.42	4.10		
30	1.39	0.13	12.50	-28.22	-26.83	-26.32	-24.46	-23.44	-1.30	1.22	1.89	3.25	4.01		
31	0.10	0.03	3.90	-23.70	-23.56	-22.80	-22.54	-22.00	4.50	4.93	5.35	5.70	6.00		
32	1.96	0.14	16.30	-28.56	-27.30	-26.57	-25.22	-23.68	-1.37	0.02	1.05	2.52	4.20		
33	0.12	0.04	3.70	-23.40	-23.28	-22.70	-22.40	-22.10	5.20	5.30	5.60	5.70	6.00		
34	0.08	0.04	2.40	-29.60	-28.90	-28.45	-28.05	-26.30	2.50	2.75	3.60	4.67	5.20		

35	0.08	0.10	1.00	-28.80	-28.64	-28.50	-28.16	-26.60	5.20	5.20	5.30	5.48	5.60
36	0.21	0.05	4.60	-24.80	-24.26	-23.85	-23.20	-21.20	3.00	3.30	3.55	4.40	5.00
37	1.01	0.11	10.70	-28.00	-26.87	-25.56	-24.28	-23.13	-0.97	0.08	1.56	2.87	4.52
38	0.11	0.06	2.10	-29.30	-29.14	-28.60	-28.24	-27.90	2.70	3.70	4.40	4.58	5.20
39	3.07			-29.55	-28.68	-26.20	-25.64	-23.25	-0.30	0.79	1.60	2.25	3.60
40	0.33	0.06	6.40	-29.92	-27.49	-26.04	-25.15	-21.40	-0.25	3.18	5.07	8.02	25.47
41	0.12	0.07	2.10	-29.40	-27.94	-27.20	-25.10	-25.00	3.30	4.30	5.15	5.56	6.00
42	0.09	0.09	1.20	-27.90	-26.98	-26.55	-25.74	-25.60	2.90	2.92	3.95	5.76	5.90
43	0.25	0.06	4.90	-28.36	-26.25	-25.12	-24.62	-18.14	0.08	4.01	5.77	7.86	12.29
44	0.08	0.05	1.90	-26.60	-26.16	-25.85	-25.44	-25.10	3.20	3.64	4.50	5.94	7.50
45	0.43	0.05	10.80	-25.80	-25.40	-25.25	-24.98	-24.50	1.40	2.36	2.80	3.02	3.40
46	3.10	0.12	24.90	-28.60	-28.48	-27.70	-27.28	-27.00	-2.40	-2.18	-1.80	-1.56	-1.50
47	0.08	0.01	33.94	-24.40	-24.02	-23.20	-22.93	-22.80	3.70	3.76	3.90	4.38	4.60
48	0.38	0.07	6.30	-28.15	-27.03	-25.45	-24.83	-22.50	2.01	3.90	5.43	7.35	14.81
49	0.13	0.04	3.70	-27.30	-26.82	-26.50	-26.34	-26.10	5.30	5.86	6.40	7.20	7.60
50	0.19	0.04	5.50	-27.39	-26.55	-25.86	-25.31	-24.32	-1.86	3.18	4.43	5.33	6.99
51	0.45	0.03	16.30	-29.00	-28.90	-28.70	-28.50	-28.40	4.20	4.22	4.25	4.28	4.30
52				-25.70	-24.73	-24.20	-23.85	-23.15	3.90	4.17	4.46	5.16	5.60
53	0.20	0.02	12.90	-29.00	-28.79	-27.70	-27.46	-26.70	2.30	3.41	3.90	4.14	4.40
54	0.08	0.01	28.07	-25.60	-25.57	-25.50	-25.16	-25.00	4.50	4.56	4.70	4.84	4.90
55	10.04	0.35	33.00	-29.20	-28.77	-27.85	-27.04	-26.70	-2.30	-2.16	-2.00	-1.79	-1.60
56	20.05	0.68	34.40	-28.90	-28.00	-27.10	-26.11	-22.75	-2.80	-2.07	-1.30	0.30	1.20
57	11.42	0.39	34.30	-27.80	-27.74	-27.60	-27.15	-26.70	1.40	1.66	3.40	3.70	3.70
58	1.81	0.06	34.90	-29.70	-27.05	-26.30	-25.60	-24.70	-7.80	-3.80	-1.00	0.77	3.00
59	1.51	0.10	18.30	-26.52	-26.06	-25.65	-25.28	-25.14	-2.51	-1.71	-0.15	1.02	2.30
60	10.62	0.41	30.10	-28.30	-27.78	-27.50	-27.10	-26.20	-3.50	-3.02	-2.05	-1.24	2.80
61	7.20			-27.60	-27.08	-26.65	-25.84	-24.80	-2.26	-1.75	-1.45	-0.90	-0.75
62	20.28	0.60	39.40	-28.80	-28.04	-27.10	-25.10	-22.10	-2.90	-2.60	-1.65	-0.59	1.33
63	3.74	0.15	28.20	-26.54	-26.16	-25.12	-23.93	-23.82	-2.70	-2.60	-2.17	-1.83	-0.65
64	2.30			-24.85	-24.73	-24.13	-23.19	-22.90	-3.72	-3.35	-2.89	-1.98	-1.92
65	7.40			-27.20	-26.46	-26.10	-24.88	-23.20	-4.87	-3.70	-3.38	-2.88	-1.72
66	8.60			-25.30	-24.35	-23.40	-22.95	-22.60	-5.74	-3.95	-3.14	-2.52	-1.60
67	19.00			-28.30	-27.47	-25.95	-21.90	-21.40	-2.27	-1.91	-1.65	-0.86	0.20
68	11.10	0.40	32.38						-2.68	-2.42	-1.78	-1.45	3.00
69	22.57	0.75	35.10	-28.90	-28.50	-27.80	-26.79	-23.20	-2.75	-1.85	-1.15	-0.63	0.03
70	10.89	0.42	30.60						-1.22	-0.22	1.22	2.04	2.55
71	7.50			-28.10	-27.20	-25.10	-24.40	-23.50	-2.73	-2.27	-1.69	-1.08	-0.70
72	5.16	0.20	30.40	-27.10	-26.64	-25.60	-24.71	-23.60	-4.10	-3.90	-2.55	0.38	3.30
73	0.79	0.05	18.60	-27.25	-27.01	-26.36	-22.63	-19.57	-3.17	-2.12	0.05	1.15	1.20
74	10.17	0.34	34.50	-29.70	-29.18	-28.60	-27.46	-23.90	-4.20	-2.60	-1.90	-1.22	0.30
75	5.80	0.26	26.00	-27.60	-27.60	-27.05	-26.85	-26.30	-2.68	-2.10	0.13	3.62	5.72
76	0.82	0.06	17.20	-28.28	-27.54	-25.56	-25.13	-25.13	-2.45	-2.15	1.40	1.83	2.60

77		0.40								-2.50	-2.37	-0.70	0.29	1.70
78	3.84	0.15	30.00	-29.00	-28.64	-28.50	-27.29	-23.40		-2.00	-1.30	-0.90	0.09	3.40
79	0.16	0.03	5.80	-28.80	-25.41	-24.65	-22.74	-21.90		0.10	1.25	1.90	2.61	2.80
80	1.65	0.08	22.60	-27.28	-26.72	-24.29	-23.21	-21.85		-2.09	-1.83	-0.95	1.38	2.36
81	3.68	0.09	47.40	-24.30	-24.16	-21.70	-20.03	-17.20		-5.45	-4.93	-3.12	-1.33	-1.31
82	0.60			-28.70	-26.27	-25.20	-24.34	-22.70		-2.58	-1.89	0.05	1.29	2.10
83	1.48	0.07	26.30	-26.70	-26.20	-25.30	-24.76	-24.40		-0.66	0.83	2.07	2.81	3.75
84	1.12	0.06	20.50	-28.30	-28.04	-27.70	-27.30	-27.00		-1.67	-0.36	2.33	3.05	5.02
85	14.67	0.66	25.90	-26.80	-26.04	-24.00	-21.60	-21.30		0.49	0.95	1.53	2.11	2.58
86	1.14			-30.86	-28.66	-27.24	-25.61	-24.10		-3.09	-1.81	-0.96	0.39	2.38
87	0.91			-30.85	-28.05	-25.85	-25.12	-24.53		-2.89	-1.72	-1.04	0.11	1.50
88	6.91	0.26	30.80	-31.30	-31.03	-28.60	-26.95	-26.60		1.55	1.66	2.29	2.65	2.84
89	5.59			-32.20	-30.96	-28.79	-26.76	-25.62		-3.57	-2.09	-1.09	0.33	1.99
90	1.28			-34.00	-32.80	-31.90	-31.20	-28.60		-2.88	-1.50	-0.63	1.33	3.80
91	0.51			-27.75	-27.12	-26.90	-25.92	-25.43		-2.12	-1.37	-0.76	-0.17	0.04
92	1.57			-29.90	-29.36	-28.45	-27.70	-27.60		1.10	1.24	1.60	1.93	2.20
94	2.80			-29.90	-29.60	-29.05	-28.49	-26.80		1.70	2.10	2.60	3.01	3.30
93	2.19	0.49	5.20	-32.00	-31.94	-31.80	-31.39	-31.20		1.96	2.00	2.09	2.95	3.35
95	1.50			-29.70	-28.75	-26.70	-26.00	-25.70		3.30	3.50	3.60	4.19	5.10
96	0.41			-29.60	-27.50	-26.10	-25.40	-25.10		0.10	0.40	0.85	1.21	2.10
97	1.66	0.26	7.50	-31.90	-30.70	-30.05	-28.94	-28.70		-0.62	0.03	0.82	1.61	1.89
98	1.17	0.17	8.20	-30.90	-30.89	-30.70	-30.04	-29.70		2.25	2.54	3.12	4.59	4.98
99					-31.59	-31.56	-31.53				-4.11	-3.97	-3.83	
100	18.53	0.38	34.50	-30.10	-30.09	-30.02	-29.95	-29.94		-4.93	-4.61	-3.94	-3.79	-3.72
101	0.09	0.01	7.00	-31.56	-30.55	-27.97	-26.86	-25.08		0.66	2.24	3.02	3.55	4.32
102	0.63	0.06	11.80	-29.58	-28.87	-28.20	-27.44	-26.70		2.18	2.68	3.03	3.60	4.46
103	0.27	0.07	4.30	-27.86	-27.31	-25.98	-25.31	-24.69		1.34	1.77	2.13	2.34	2.42
104	0.16	0.09	2.10	-31.46	-30.75	-29.03	-27.60	-25.38		4.49	4.83	5.34	6.02	6.38
105	0.08	0.11	0.80	-26.09	-25.54	-24.80	-24.21	-22.24		-0.49	0.17	0.32	0.42	1.79
106	1.23	0.19	7.60	-28.09	-27.41	-26.57	-25.42	-24.12		-1.19	-0.01	0.24	0.65	1.10
107	0.17	0.01	14.30	-27.36	-26.85	-26.46	-26.15	-25.75		4.00	4.21	4.88	5.55	5.88
108	0.20	0.02	9.30	-26.95	-26.69	-24.21	-23.67	-23.51		1.55	1.71	2.19	3.44	4.22
109	0.95	0.09	12.70	-27.63	-24.44	-24.04	-23.80	-23.57		3.05	3.25	3.60	3.96	4.67
110	5.77	0.39	17.10	-27.65	-26.35	-25.44	-24.76	-23.47		-0.44	3.36	5.33	7.23	10.52
111	0.79	0.11	8.30	-24.28	-23.99	-23.84	-23.54	-23.35		1.97	2.44	3.46	4.24	5.06
112	11.54	0.66	20.40	-27.98	-27.70	-26.80	-25.58	-24.45		4.26	5.15	5.88	11.77	12.90
113	10.87	0.59	21.50	-27.87	-27.20	-26.72	-25.73	-25.18		4.49	5.37	5.69	6.03	7.05
114	14.34	0.68	24.50	-29.11	-28.67	-27.91	-26.89	-25.34		4.05	4.64	5.23	9.17	13.39
115	1.52	0.15	11.80	-25.72	-24.77	-24.25	-23.83	-22.71		2.27	4.18	4.76	5.20	5.52
116	2.88	0.24	14.00	-31.50	-31.29	-30.70	-29.25	-27.00		8.90	9.50	10.40	11.30	12.00
117	2.92	0.34	10.00	-29.54	-29.08	-28.26	-27.64	-27.05		5.98	9.65	10.42	10.90	11.77
118	2.89	0.29	11.60	-30.91	-29.27	-28.28	-27.50	-24.27		3.91	5.48	6.10	7.27	8.74

119	2.36	0.14	19.60	-29.62	-29.37	-28.80	-28.22	-27.76	3.92	5.35	6.52	7.69	10.70
120	5.20	0.26	23.30	-30.33	-30.13	-29.55	-28.60	-24.77	3.53	7.12	9.05	10.35	11.48
121	4.52	0.24	21.50	-30.91	-30.19	-29.61	-29.01	-27.32	3.24	6.91	8.89	10.76	11.80
122	1.34	0.20	7.82	-30.24	-30.08	-29.66	-29.45	-29.33	6.40	7.40	8.60	9.80	11.20
123	9.90	0.42	27.80	-30.46	-30.38	-30.18	-29.91	-29.72	-0.59	-0.06	1.37	2.14	2.47
124	7.94	0.27	34.05	-28.75	-28.57	-28.37	-28.14	-27.80	-0.37	-0.15	0.56	1.74	2.97
125	8.13	0.28	33.70	-29.90	-29.61	-28.37	-27.58	-27.49	0.16	0.64	1.84	4.03	4.55
126	5.68			-28.75	-28.52	-28.25	-27.42	-26.76	-0.37	-0.07	1.15	1.90	2.97
127	9.94	0.00		-28.50	-28.01	-27.39	-26.82	-26.07	0.10	1.23	2.09	2.98	3.70
128	5.38	0.26	24.60	-30.00	-29.60	-28.85	-27.30	-23.50	-1.20	-0.10	0.70	2.20	2.90
129	9.57	0.30	37.00	-29.00	-28.74	-28.42	-28.09	-27.86	-0.05	0.11	0.22	0.55	0.76
130	6.26			-28.61	-27.63	-27.28	-26.63	-25.96	-2.26	-2.01	-1.67	1.02	1.73
131	0.97	0.11	10.70	-30.14	-29.90	-29.44	-29.16	-29.07	1.01	1.27	1.72	1.95	2.00
132	2.66	0.16	19.50	-31.00	-29.95	-29.35	-28.45	-27.05	-3.75	-1.70	-0.50	0.40	3.10
133				-31.55	-30.15	-29.25	-28.45	-27.30	-2.65	-0.40	1.00	2.25	3.35
134	6.75	0.40	19.70	-31.90	-30.25	-29.80	-29.45	-28.95	-1.75	0.45	1.55	3.45	8.80
135	3.45	0.15	27.10	-31.80	-31.69	-31.05	-29.61	-27.70	-2.20	-1.28	-0.50	-0.12	0.10
136	0.13	0.01	24.30	-30.75	-29.90	-29.00	-27.04	-25.60	-0.90	-0.01	0.95	2.63	5.50
137	2.26	0.13	20.70	-31.95	-31.30	-30.50	-29.27	-28.10	-1.30	-0.39	0.16	0.67	1.45
138	2.59	0.17	17.30	-28.93	-28.69	-28.39	-28.06	-23.26	-3.25	-1.60	-1.13	-0.44	0.07
139	1.53	0.13	13.60	-30.42	-29.46	-28.59	-27.50	-27.25	-3.97	-3.03	-2.27	-0.92	-0.30
140	0.69	0.09	8.60	-30.80	-30.22	-28.91	-28.14	-27.84	-1.14	0.00	0.69	1.47	5.82
141	0.52	0.12	5.18			-29.92					-3.70		
142	0.16	0.08	2.52	-29.47	-28.91	-28.32	-27.94	-26.27	-6.54	-5.82	-3.58	-2.59	-1.93
143	3.38	0.12	32.64	-33.76	-33.15	-32.55	-31.92	-31.87	-1.80	-1.07	-0.85	-0.35	0.72
144	0.95	0.03	35.96	-34.39	-33.06	-32.59	-32.16	-26.71	-4.96	-0.78	0.37	2.59	14.98
145	0.04	0.00	10.60	-26.93	-26.53	-25.67	-24.82	-24.42	-2.44	-2.35	-2.16	-1.97	-1.88
146	0.31	0.01	56.77	-33.40	-29.20	-28.00	-27.52	-26.89	-2.79	-1.57	-0.93	-0.21	0.41
147	0.02	0.01	3.12	-26.57	-26.32	-25.40	-25.19	-25.15	-2.59	-2.28	-1.94	-1.58	-0.84
148	5.03	0.39	15.00	-37.19	-36.18	-30.26	-29.45	-29.33	-12.62	-11.26	-5.17	-3.31	-2.63
149	6.35	0.19	38.39	-37.50	-36.49	-36.17	-34.56	-27.95	0.42	1.42	1.61	1.88	2.57
150	0.22	0.03	8.47	-35.92	-35.28	-27.66	-25.52	-24.99	-3.99	-3.29	0.68	2.18	2.84
151	1.55	0.07	27.30	-35.74	-29.42	-29.03	-28.72	-28.11	0.89	1.89	2.49	2.87	3.23
152	0.09	0.01	8.77	-28.76	-26.20	-25.18	-24.74	-24.42	0.60	0.65	0.95	1.28	1.47
153	1.00	0.06	20.77	-33.68	-33.16	-32.21	-28.52	-27.37	-2.26	0.40	1.14	2.37	2.72

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Table 2. Flux constants (k_i) for reservoir model fluxes

FLUX	k_i
f_{VOL}	5.63E-04
f_{RIV}	3.13E-04
f_{DT}	6.25E-04
f_{DW}^*	7.48E-05
f_{DS}	2.00E-04
f_W	3.57E-08
f_{FIX-T}	3.08E-08
f_{DEP}	6.41E-09
f_{FIX}	5.00E-08
f_{BUR}	3.13E-05

All values as fraction of reservoir mass

* Includes f_{ANX}