Supplementary Table 1. Data sources

Sources of stage-specific abundance data for *C. glacialis* and *C. hyperboreus* (ind. m^{-2} or ind. m^{-3}), with relevant references (if available) and temporal and spatial data coverage. The ID numbers of data sources that contained depth-specific abundance data (not only depth-integrated) are bolded. The data compilation will be made available online at www.arcticdata.io.

ID	Source	Dataset	Publications	Years	Area	Net type (mesh size, µm)
1	COPEPOD Global Plankton Database	Biological Atlas of the Arctic Seas 2000		1938, 1939, 1952-1957, 1962, 1981	Barents Sea, Kara Sea, Nansen Basin	Juday net (168/170)
2	COPEPOD Global Plankton Database	Brodskii 1950	Brodsky KA (1950) Copepods (Calanoida) of the far-eastern seas of the USSR and the polar basin. Keys ot the Fauna of the USSR. Vol 35. Zoological Institute of the Academy of Sciences of the USSR, Leningrad. 441p	1950-1951	Greenland Sea	Nansen net (65), K-100 (94)
3	COPEPOD Global Plankton Database	NEWP (NorthEast Water Polynya Project)	Ashjian C et al. (1997). Distribution of zooplankton in the Northeast Water Polynya during summer 1992. J Mar. Syst. 10:279–298	1992-1993	Greenland Sea	Mocness (149), Bongo net (153)
4	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	Pautzke CG (1979): Copepoda collected from the Canada Basin Arctic Ocean; Fletcher's Ice Island (T-3) 1970-1972 and AIDJEX, 1975	Dawson JK (1978) Vertical distribution of *Calanus hyperboreus* in the central Arctic Ocean. Limnol Oceanogr 23:950–957	1970-1972, 1975	Canada Basin	English net (215), ring net (73), plankton net (223)
5	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	Scott DA, English TS (1969). Copepoda collected from Fletcher's Ice Island (T-3) in the Canadian Basin of the Arctic Ocean. Technical Report No. 240, Reference M69-62. University of Washington and Arctic Ocean Diversity, University of Alaska Fairbanks, Fairbanks	Various	1966-1969	Canada Basin	0.5m pump (215), 1m ring net (110/215), 2m2 net (215/223), 3m2 net (300)

6	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	Darnis G, Barber DG, Fortier L (2008) Sea ice and the onshore-offshore gradient in pre-winter zooplankton assemblages in southeastern Beaufort Sea. J Mar. Syst. 74:994–1011	Same as dataset	2002	Beaufort Sea	1m2 plankton net (200)
7	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	Grainger EH, Grohe C (1975). Zooplankton Data from the Beaufort Sea, 1951-1975. Environment Canada, Fisheries and Marine Service, Technical Report No 591, 51, pg.	Same as dataset	1951	Canada Basin	Plankton net (282)
8	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	Hopky GE, Lawrence MJ, Chiperzak DB (1994) NOGAP B2 ; Zooplankton Data from the Canadian Beaufort Sea Shelf, 1984 and 1985. Can Data Rep Fish Aquat Sci 922	Same as dataset	1985-1988	Beaufort Sea	Bongo net (85/500), Neuston net (85/500), Wisconsin net (63)
9	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	K.N. Kosobokova	Kosobokova K, Hirche H-J (2009) Biomass of zooplankton in the eastern Arctic Ocean – A base line study. Prog Oceanogr 82:265–280	1972, 1975-1977, 1998-2003	Central Artic Ocean, White Sea	Juday net 0.1m2 (180)
10	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	Kosobokova KN, Hopcroft R (2010). Diversity and vertical distribution of mesozooplankton in the Arctic's Canada Basin. Deep Sea Res Part 2 57:96-110	Same as dataset. Also: Kosobokova K, Hirche HJ (2009) Biomass of zooplankton in the eastern Arctic Ocean–A base line study. Prog Oceanogr 82:265–280	2005	Canada Basin	Multinet 0.25m diameter (150)
11	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-	Hopcroft R, Clarke C, Nelson RJ, Raskoff KA (2005). Zooplankton Communities of the Arctic's Canada Basin: the contribution by smaller taxa. Polar Biol 28: 198-206	Same as dataset	2002	Canada Basin	Bongo net 6m diameter (53)

	575ac6f9d445). Part 1: Western Hemisphere					
12	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	Walkusz WJE et al. (2008). Zooplankton and Ichthyoplankton Data Collected from the Chukchi and Beaufort Seas During the R/V/ Mirai Cruise, September 2002. Canadian Data Report of Fisheries and Aquatic Science 1211	Same as dataset	2002	Chukchi Sea, Beaufort Sea	Bongo net (333)
13	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 1: Western Hemisphere	Fortier L, Darnis G. The pre-winter 2007 vertical distribution of zooplankton in the Cape Bathurst and North Water polynyas, and Lancaster Sound, Canadian Arctic		2007	Canadian Archipelago	Hydrobios Multinet (200)
14	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities (doi: urn:uuid:c717717b-8b5c-459d-80cc-575ac6f9d445). Part 2: Eastern Hemisphere	Hirche HJ et al. (2006) Structure and function of contemporary food webs on Arctic shelves: A panarctic comparison. The pelagic system of the Kara Sea - Communities and components of carbon flow. Prog Oceanogr 71:288–313	Same as dataset	1999-2001	Kara Sea	Nansen net (150)
15	NSF Arctic Data Center. Russ Hopcroft (2014): Environmental change in the Arctic Ocean: a synthesis and retrospective analysis of zooplankton communities. Part 2: Eastern Hemisphere	Markhaseva EL, Golikov AA, Agapova TA, Beig AA (1985). Archives of the Arctic Seas Zooplankton Contributions from the Zoological Institute RAS. No 8NA. Updated version from I. Rutzen (personal communcation)	Same as dataset	1935, 1938, 1939, 1946-1948, 1950, 1952, 1954-1956, 1970, 1972, 1973	Barents Sea, Kara Sea, Laptev Sea, East Siberian Sea, Chukchi Sea, Central Arctic Ocean	Juday net (64/168/333), K-100 (569), Nansen closing net (94/333), Nansen surface net (333), plankton net (569)
16	NSF Arctic Data Center	Carin Ashjian. 2010. AON: Annual Observations of the Biological and Physical Marine Environment in the Chukchi and Nearshore Beaufort Seas near Barrow, AK (doi:10.18739/A2X08K, urn:uuid:14610858-43d4-42f0-ade1-c6f065787339)		2010-2015	Beaufort Sea	Tucker trawl (350/500), ring net (150)

17	NSF Arctic Data Center	Carin Ashjian, Robert Campbell, and Stephen Okkonen. 2013. Collaborative Research: A winter expedition to explore the biological and physical conditions of the Bering, Chukchi, and Southern Beaufort Seas (urn:uuid:9f967a18-997a-4f8b-816d-39e4a0b9d74b).		2011	Bering Sea, Chukchi Sea, Beafort Sea	Paired Bongo net/Hydrobios Multinet (53/150)
18	NSF Arctic Data Center	Carin J. Ashjian and Robert G. Campbell. 2016. Mesozooplankton Abundance and Biomass. SHEBA drift experiment (urn:uuid:a4b4aa8c-f600-4fd1-a0e2-c259cc8aa83d)	Ashjian C et al. (2003). Annual cycle in abundance, distribution, and size in relation to hydrography of important copepod species in the western Arctic Ocean. DEEP-SEA RES PT I: 50, 1235–1261	1997-1998	Canada Basin, Chukchi Sea	Ring net (53/150)
19	NSF Arctic Data Center	Peter Lane, Dora Sorarrain-Pilz, Sharon L. Smith, and Leopoldo Llinas. 2016. HLY-02-03 Zooplankton Abundance (HLY0203: doi:10.5065/D6FQ9TQZ; HLY0402: doi:10.5065/D69G5JWQ; HLY0403: doi:10.5065/D6PK0D73)	Lane PVZ et al. (2008). Zooplankton distribution in the western Arctic during summer 2002: Hydrographic habitats and implications for food chain dynamics. J. Mar. Syst.: 70, 97-133	2002, 2004	Chukchi Sea, Beaufort Sea, Canada basin	Mocness (153), Bongo net 60cm diameter (150/153), 0.25m2 Multinet (150)
20	NSF Arctic Data Center	Carin J. Ashjian and Robert G. Campbell. 2016. SBI mesozooplankton abundance (HLY0201: doi:10.5065/D69W0CJD; HLY0203: doi:10.5065/D6ZW1J11; HLY0402: doi:10.5065/D68S4N15; HLY0403: doi:10.5065/D6W9578G)		1998, 2002, 2004	Chukchi Sea, Beaufort Sea, Canada basin	1m2 ring net (150)
21	NSF Arctic Data Center	Sharon L. Smith. 2016. Copepod Abundance and Measurements in Historical Zooplankton Samples (doi:10.5065/D6G44NCZ)	Johnson M (1956). The Plankton of the Beaufort and Chukchi Sea Areas of the Arctic and its relation to the Hydrography, Arctic Institute of North America, Technical Paper No. 1, 32 pp	1950-1951	Chukchi Sea, Beaufort Sea	Nansen net (158)
22	NSF Arctic Data Center	Carin J. Ashjian. 2016. SNACS: Environmental Variability, Bowhead Whale Distributions, and Inupiat Subsistence Whaling - biological data (doi:10.5065/D6KW5D58).		2005-2006	Beaufort Sea	Bongo net (150)
23	NSF Arctic Data Center	Kenneth O. Coyle and Alexei I. Pinchuk. 2016. Mesozooplankton population and biomass in the eastern Bering Sea-CalVET data-Preliminary (doi:10.5065/D6833Q25)		2008	Bering Sea	CALVET vertical tow 25cm diameter (150)

24	NSF Arctic Data Center	Edward Durbin and Maria C. Casas. PSEA-10-01 Zooplankton abundance. Arctic Data Center (doi:10.5065/D61N7Z4T)		2010	Bering Sea	Ring net 0.5m diameter (64)
25	Arctic Ocean Diversity (arcodiv.org/Database/Plankton_datasets.html)	Archives Arctic Seas Zooplankton 1900-1973 (R. Hopcroft, accessed by S. Mills [personal communication]. No longer available)	Various. Some data overlapped with dataset ID 1 and 15, these were removed from the present dataset.	1934,1935, 1939,1948, 1950,1951, 1954-1956,1969, 1971-1973	Central Arctic Ocean, Kara Sea, Barents Sea	Juday net (168), Nansen net (333), water pump (64)
26	Arctic Ocean Diversity (arcodiv.org/Database/Plankton_datasets.html)	Zooplankton in the Nearshore Beaufort Sea (Accessed by S. Mills [personal communication]. No longer available)	Horner R, Murphy D (1985). Species Composition and Abundance of Zooplankton in the Nearshore Beaufort Sea in Winter-Spring. Arctic: 38, 201–209	1978-1979	Beaufort Sea	Ring net 0.75m diameter (308), ring net 0.5m diameter (209)
27	Arctic Ocean Diversity (arcodiv.org/Database/Plankton_datasets.html)	Beaufort Sea Zooplankton (CASES). (Accessed by S. Mills [personal communication]. No longer available)		2003-2004	Beaufort Sea/Canadian Archipelago	Multi-sampler 0.5m2 (200)
28	Arctic Ocean Diversity (arcodiv.org/Database/Plankton_datasets.html)	Chukcki Sea Zooplankton 1953/1954 (Zooplankton vertical stratified collections on board of the Russian R/V Lomonosov, program ANII A-65). (Accessed by S. Mills [personal communication]. No longer available)		1953-1954	Chukchi Sea	Nansen net (333)
29	NODC NOAA	Ecosystem monitoring information collected in Hanna Shoal in the Chukchi Sea for the COMIDA CAB project from August 2012 to August 2013 (NODC Accession 0123220)	Dunto KH et al. (2014). Hanna Shoal Ecosystem Study. Version 1.1. National Oceanographic Data Center, NOAA. doi:10.7289/V5GX48MN	2012-2013	Chukchi Sea	Bongo net (150)
30	NODC NOAA	Zooplankton, temperature, and salinity from various instruments from multiple ships in the White Sea during the period 1961-1999 (NODC Accession 0001302)	Persson et al. (2012). Scale-dependent effects of climate on two copepod species, *Calanus glacialis* and *Pseudocalanus minutus*, in an Arctic-boreal sea. MEPS, 468, 71–83.	1963-1998	White Sea	Juday net (168)
31	pangae.de	Kosobokova KN, Hirche HJ (2014): Zooplankton abundance measured on multinet samples during POLARSTERN cruise ARK-IX/4 to the Laptev Sea and Arctic Ocean in 1993. doi:10.1594/PANGAEA.839758	Kosobokova KN, Hanssen HJ, Knickmeier K (1998). Composition and distribution of zooplankton in the Laptev Sea and adjacent Nansen Basin during summer, 1993. Polar Biol: 19, 63-76	1993	Laptev Sea, Nansen Basin	Multinet (150)

32	pangae.de	Swalethorp R, Kjellerup S, Nielsen TG (2013): Mesozooplankton abundance data from Disko Bay, West Greenland, 2008. doi:10.1594/PANGAEA.815102	Swalethorp R et al. (2011). Grazing, egg production, and biochemical evidence of differences in the life strategies of *Calanus finmarchicus*, *C. glacialis* and *C. hyperboreus* in Disko Bay, Western Greenland. MEPS: 429, 125–144	2008	Western Greenland	Hydrobios Multinet (50), WP2 (50)
33	pangae.de	Swalethorp R, Kjellerup S, Nielsen TG (2013): Mesozooplankton abundance data from the fjord branch Kapisigdlit located in the Godthaabsfjord system, West Greenland, 2010. doi:10.1594/PANGAEA.810996	Riisgaard K et al. (2014) Trophic role and top-down control of a subarctic protozooplankton community. MEPS: 500, 67-82.	2010	Western Greenland	Hydrobios Multinet (50), WP2 (50)
34	BioChem	DFO (2017). BioChem: database of biological and chemical oceanographic data. Department of Fisheries and Oceans, Canada (accessed 3.27.2017)	Devine L et al. (2014). BioChem: the Fisheries and Oceans Canada database for biological and chemical data. Can. Tech. Rep. Fish. Aquat. Sci. 3073: v + 40 pp.	1992-1993, 1997-2016	Scotian Shelf, Gulf of St. Lawrence, Hudson Bay	Ring net 0.5m (73), ring net 0.75m (202), ring net 1m (158/333), Bongo net 50cm (158/333)
35	Norwegian Marine Data Centre (NMDC)	IMR Zooplankton Barents Sea (accessed 10.9.2018)		1981-2016	Barents Sea	Juday net 36cm (180), Juday net 80cm (250/375), WP2 net 56 cm (180), Russehåv/Juday (180)
36	Norwegian Marine Data Centre (NMDC)	IMR Zooplankton Norwegian Sea (accessed 10.9.2018)	Various	1984-2016	Norwegian Sea, N/W Spitsbergen Shelf	Juday net 36cm (180), Juday net 80cm (250), WP2 net 56cm (180),
37	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1156	Data provided by Sigrún Jónasdóttir	Arnkværn G, Daase M, Eiane K (2005). Dynamics of coexisting *Calanus finmarchicus*, *Calanus glacialis* and *Calanus hyperboreus* populations in a high-Arctic fjord. Polar Biol: 28, 528–538.	2001-2002	Svalbard	WP2 net (180), WP3 net (180)
38	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Astthorsson OS, Gislason A (2003). Seasonal variations in abundance, development and vertical distribution of *Calanus finmarchicus, C. hyperboreus* and *C. glacialis* in the East Icelandic Current. JPR: 25, 843–854	1995	Iceland Sea	Bongo net (200)

39	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Auel H, Klages M, Werner I (2003). Respiration and lipid content of the Arctic copepod *Calanus hyperboreus* overwintering 1 m above the seafloor at 2,300 m water depth in the Fram Strait. Mar Biol: 143, 275–282	2000	Fram Strait	Multinet (300)
40	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Gislason A, Silva T (2012). Abundance, composition, and development of zooplankton in the Subarctic Iceland Sea in 2006, 2007, and 2008. ICES JMS: 69, 1263–1276	2006-2008	Iceland Sea	Multinet (200)
41	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Hirche HJ, Kwasniewski S (1997). Distribution, reproduction and development of *Calanus* species in the Northeast Water in relation to environmental conditions. J. Mar. Syst.: 10, 299–317	1993	Greenland Sea	Bongo net (200)
42	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Hirche HJ, Mumm N (1992). Distribution of dominant copepods in the Nansen Basin, Arctic Ocean, in summer. DSR Part A: 39, 485–505	1987	Nansen Basin	Kiel Multinet (300)
43	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Hirche HJ (1997). Life cycle of the copepod *Calanus hyperboreus* in the Greenland Sea. Mar Biol: 128, 607–618	1988-1995	Greenland Sea	Multinet (150)
44	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Munk P et al. (2003). Changes in plankton and fish larvae communities across hydrographic fronts off West Greenland. JPR: 25, 815–830	1996	W. Greenland	WP2 net (200)
45	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Pasternak A et al. (2001). Seasonal changes in feeding, gonad development and lipid stores in *Calanus finmarchicus* and *C. hyperboreus* from Malangen, northern Norway. Mar Biol: 138, 1141–1152	1992	Northern Norway	Mocness (180)

46	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Hirche HJ, Kosobokova K (2003). Early reproduction and development of dominant calanoid copepods in the sea ice zone of the Barents Sea - need for a change of paradigms? Mar Biol: 143, 769–781	1997	Barents Sea	Multinet (150)
47	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Madsen SD, Nielsen TG, Hansen BW (2001). Annual population development and production by *Calanus finmarchicus*, *C. glacialis* and *C. hyperboreus* in Disko Bay, western Greenland. Mar Biol: 139, 75–93	1996-1997	W. Greenland	WP2 net (200)
48	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Daase M et al. (2008). Vertical distribution of *Calanus* spp. and *Metridia longa* at four Arctic locations. Mar. Biol. Res.: 4, 193–207	2002	N/W Spitsbergen Shelf	Multinet (180)
49	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Falk-Petersen S et al. (1999). Spatial distribution and life-cycle timing of zooplankton in the marginal ice zone of the Barents Sea during the summer melt season in 1995. JPR: 21, 1249–1264	1995	Barents Sea	WP2 net (180)
50	Visser AW, Grønning J, Jónasdóttir SH (2017). Calanus hyperboreus and the lipid pump. Limnol. Oceanogr: 62, 1155-1157	Data provided by Sigrún Jónasdóttir	Sameoto DD, Herman AW (1990). Life cycle and distribution of *Calanus finmarchicus* in deep basins on the Nova Scotia shelf and seasonal changes in *Calanus* spp.. MEPS: 66, 225–237.	1984-1988	Scotian Shelf	BIONESS/Ring net (246)
51	Munk P, Nielsen TG, Hansen BW (2015). Horizontal and vertical dynamics of zooplankton and larval fish communities during mid-summer in Disko Bay, West Greenland. JPR: 37, 554–570	Data provided by Peter Munk	Same as dataset	1997	W Greenland	Submersible pump (50)