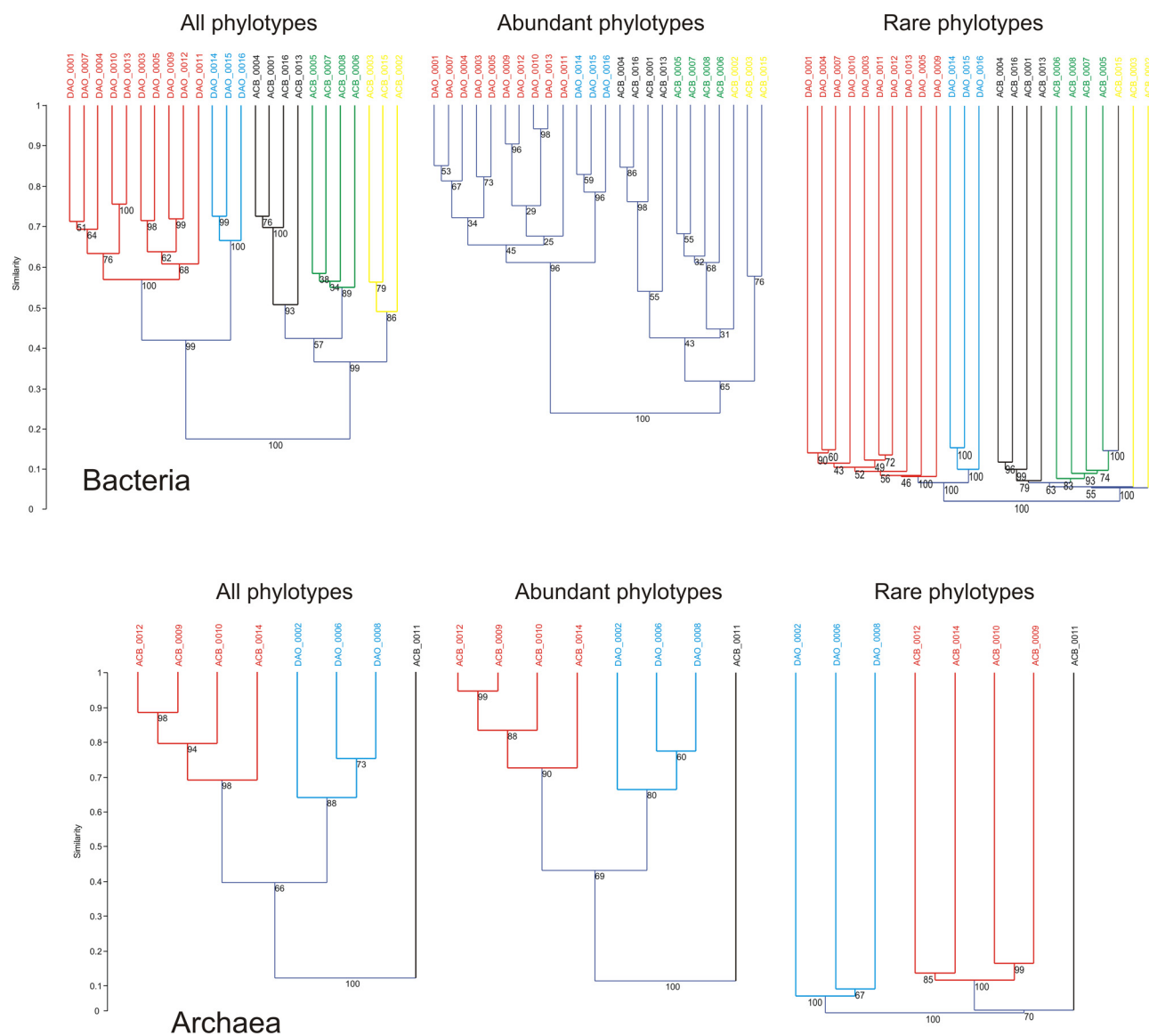


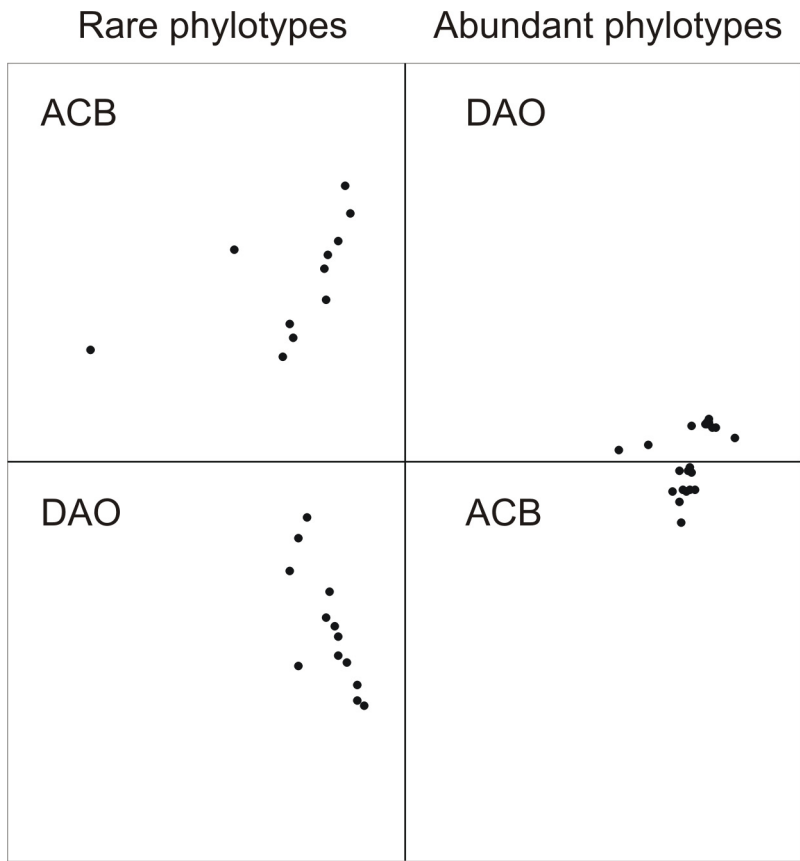
# Supporting Information

Galand et al. 10.1073/pnas.0908284106



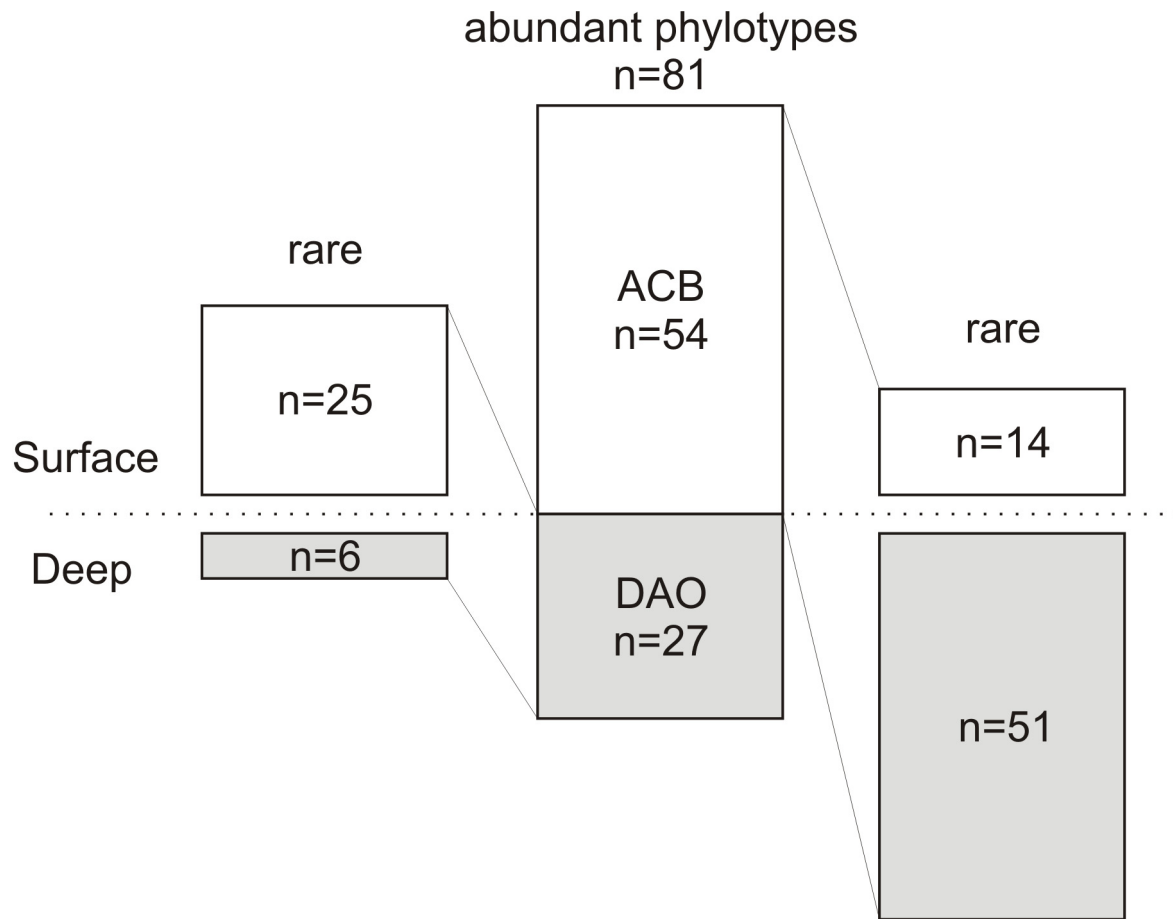
**Fig. S1.** Dendrograms representing the similarity between the composition of 24 bacterial communities from deep (DAO) and surface (ACB) water masses of the Arctic Ocean. Phylotypes are defined as single sequence identity level (100% identity between sequences). The clustering pattern including all phylotypes is compared with the clustering for abundant phylotypes only (frequency > 1%) and for rare phylotypes only (< 0.01%). Colors highlight the clusters conserved through the three analyses.





**Fig. S3.** Nonmetric multidimensional scaling analysis of the phylotype composition of the abundant (>1%) and rare (<0.01%) bacterial biosphere ( $n = 48$ ). Phylotypes are defined as grouping sequences with 100% identity. Calculated stress for this analysis using Bray–Curtis similarity = 0.204.





**Fig. S5.** Schematic showing the distribution between surface and deep waters of the 81 bacterial phylotypes found abundant in some communities and rare in others. Phylotypes comprised all sequences having a best match to the same reference sequences.

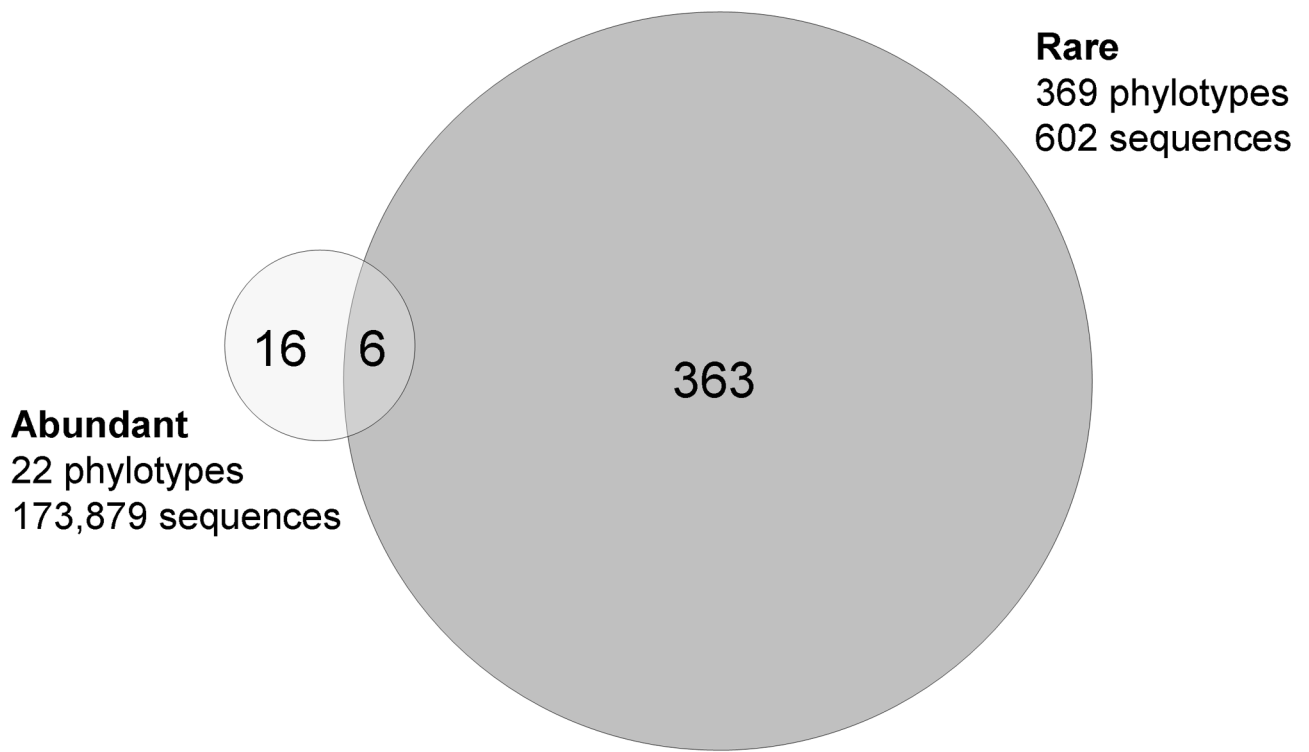
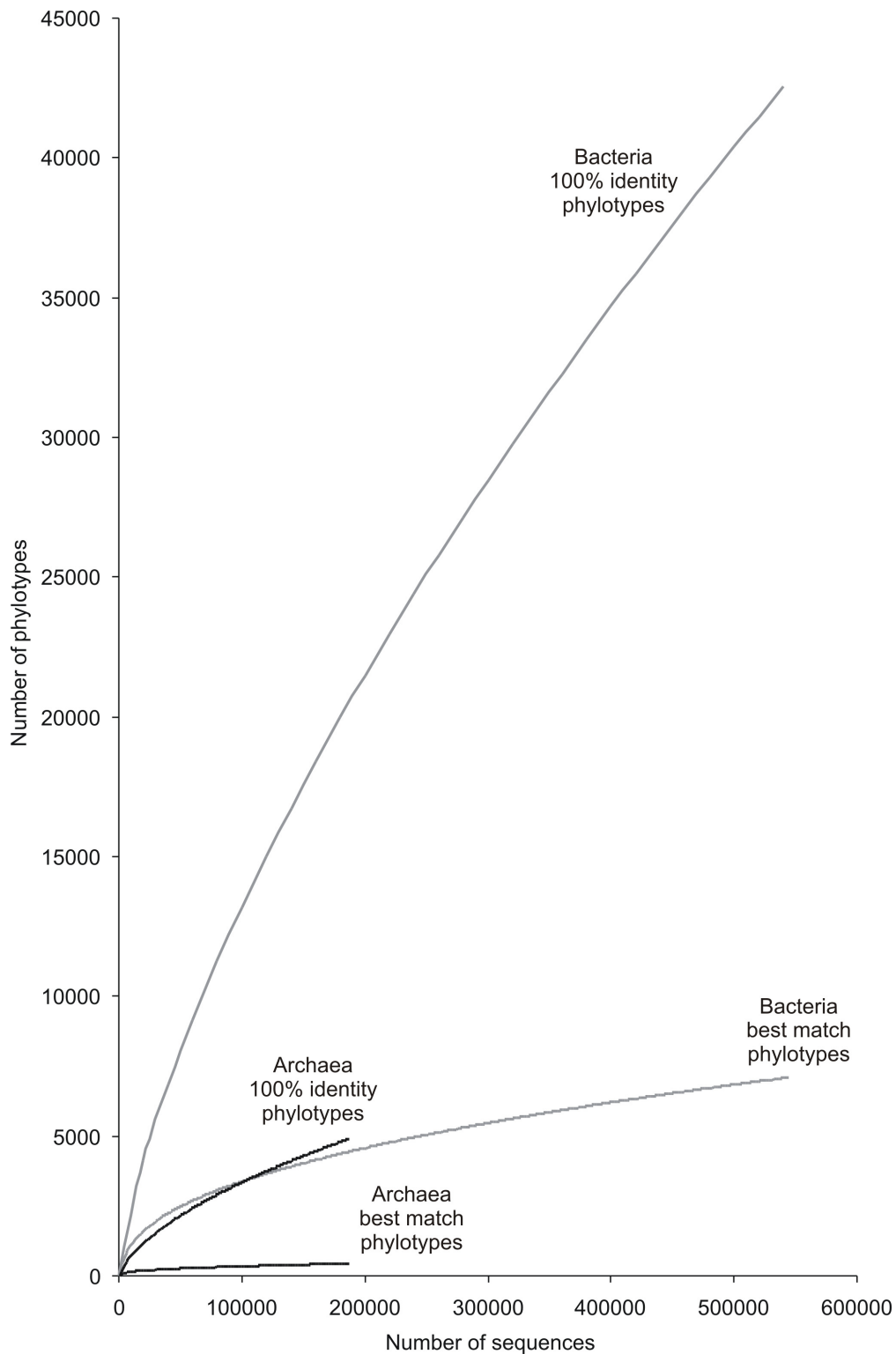


Fig. S6. Venn diagram illustrating the number of archaea phylotypes being rare in all samples (dark gray) vs. phylotypes being rare in some samples but abundant in others (overlap area) and phylotypes always abundant and never rare (white area).



**Fig. S7.** Rarefaction curves for archaea and bacteria for all samples grouped together. The figure illustrates the four different level of diversity used in our ecological study of the rare marine biosphere. Rarefaction was calculated for two different levels of phylotype definition. For the 100% identity definition, all sequences with 100% identity were grouped as a same phylotype. For the best-match definition, all sequences with the same best match to a sequence from the reference database were grouped together.

**Table S1. Sample information for 32 bacterial and archaeal communities from the Arctic Ocean**

Sample ID	Domain	Date	Lat. °N	Long. °W	Depth	Region	Temp.	Salinity	No. sequences
ACB_0001	Bacteria	13/07/2007	71.45	-156.06	2	Coastal Beaufort	2.5	20.0	17,254
ACB_0002	Bacteria	11/07/2007	71.43	-156.86	2	Coastal Chukchi	4.6	32.0	9,849
ACB_0003	Bacteria	26/01/2007	71.35	-156.68	2	Coastal Chukchi	-1.8	35.0	19,376
ACB_0004	Bacteria	30/01/2008	71.35	-156.68	2	Coastal Chukchi	-2.0	35.0	21,064
ACB_0005	Bacteria	29/07/2002	72.32	-151.98	10	Beaufort Sea	-1.5	29.4	22,575
ACB_0006	Bacteria	06/08/2002	72.24	-159.34	10	Chukchi Sea	-1.1	29.5	17,330
ACB_0007	Bacteria	30/07/2004	71.54	-150.89	8.4	Beaufort Sea	5.2	29.9	19,267
ACB_0008	Bacteria	21/08/2004	72.42	-152.02	39.7	Beaufort Sea	-1.2	30.3	15,875
ACB_0009	Archaea	13/07/2007	71.45	-156.06	2	Coastal Beaufort	2.5	20.0	27,836
ACB_0010	Archaea	30/01/2008	71.35	-156.68	2	Coastal Chukchi	-1.8	35.0	29,088
ACB_0011	Archaea	30/07/2004	71.54	-150.89	8.4	Beaufort Sea	5.2	29.9	20,867
ACB_0012	Archaea	28/01/2008	71.35	-156.68	2	Coastal Chukchi	-1.8	35.0	33,152
ACB_0013	Bacteria	17/01/2004	70.04	-126.30	3	Franklin Bay	-1.6	29.8	13,604
ACB_0014	Archaea	17/01/2004	70.04	-126.30	3	Franklin Bay	-1.6	29.8	29,449
ACB_0015	Bacteria	16/07/2004	70.05	-126.31	1.5	Franklin Bay	4.0	29.0	54,548
ACB_0016	Bacteria	28/01/2008	71.35	-156.68	2	Coastal Chukchi	-1.8	35.0	20,677
DAO_0001	Bacteria	12/07/2007	68.83	-61.76	1000	Baffin Bay	0.9	34.5	28,762
DAO_0002	Archaea	12/07/2007	68.83	-61.76	1000	Baffin Bay	0.9	34.5	18,780
DAO_0003	Bacteria	04/08/2007	71.96	-150.23	1000	Beaufort Sea	0.0	34.9	20,160
DAO_0004	Bacteria	04/08/2007	71.96	-150.23	395	Beaufort Sea	0.8	34.8	26,293
DAO_0005	Bacteria	12/08/2007	79.99	-149.99	1000	Beaufort Sea	0.0	34.9	18,894
DAO_0006	Archaea	12/08/2007	79.99	-149.99	1000	Beaufort Sea	0.0	34.9	16,194
DAO_0007	Bacteria	12/08/2007	79.99	-149.99	410	Beaufort Sea	0.9	34.8	33,191
DAO_0008	Archaea	12/08/2007	79.99	-149.99	410	Beaufort Sea	0.9	34.8	19,741
DAO_0009	Bacteria	15/08/2007	77.00	-140.19	1000	Beaufort Sea	0.0	34.9	15,400
DAO_0010	Bacteria	15/08/2007	77.00	-140.19	400	Beaufort Sea	0.9	34.8	21,740
DAO_0011	Bacteria	20/08/2007	75.84	-128.64	900	Beaufort Sea	0.1	34.9	22,816
DAO_0012	Bacteria	23/08/2007	73.97	-140.09	1000	Beaufort Sea	0.0	34.9	24,270
DAO_0013	Bacteria	23/08/2007	73.97	-140.09	428	Beaufort Sea	0.7	34.8	17,721
DAO_0014	Bacteria	18/09/2007	77.75	126.00	996	Laptev Sea	0.0	34.9	39,353
DAO_0015	Bacteria	21/09/2007	79.94	142.39	1191	Laptev Sea	-0.3	34.9	28,455
DAO_0016	Bacteria	21/09/2007	79.94	142.39	252	Laptev Sea	1.4	34.8	16,772

Lat., latitude; Long., longitude, Temp. temperature.



