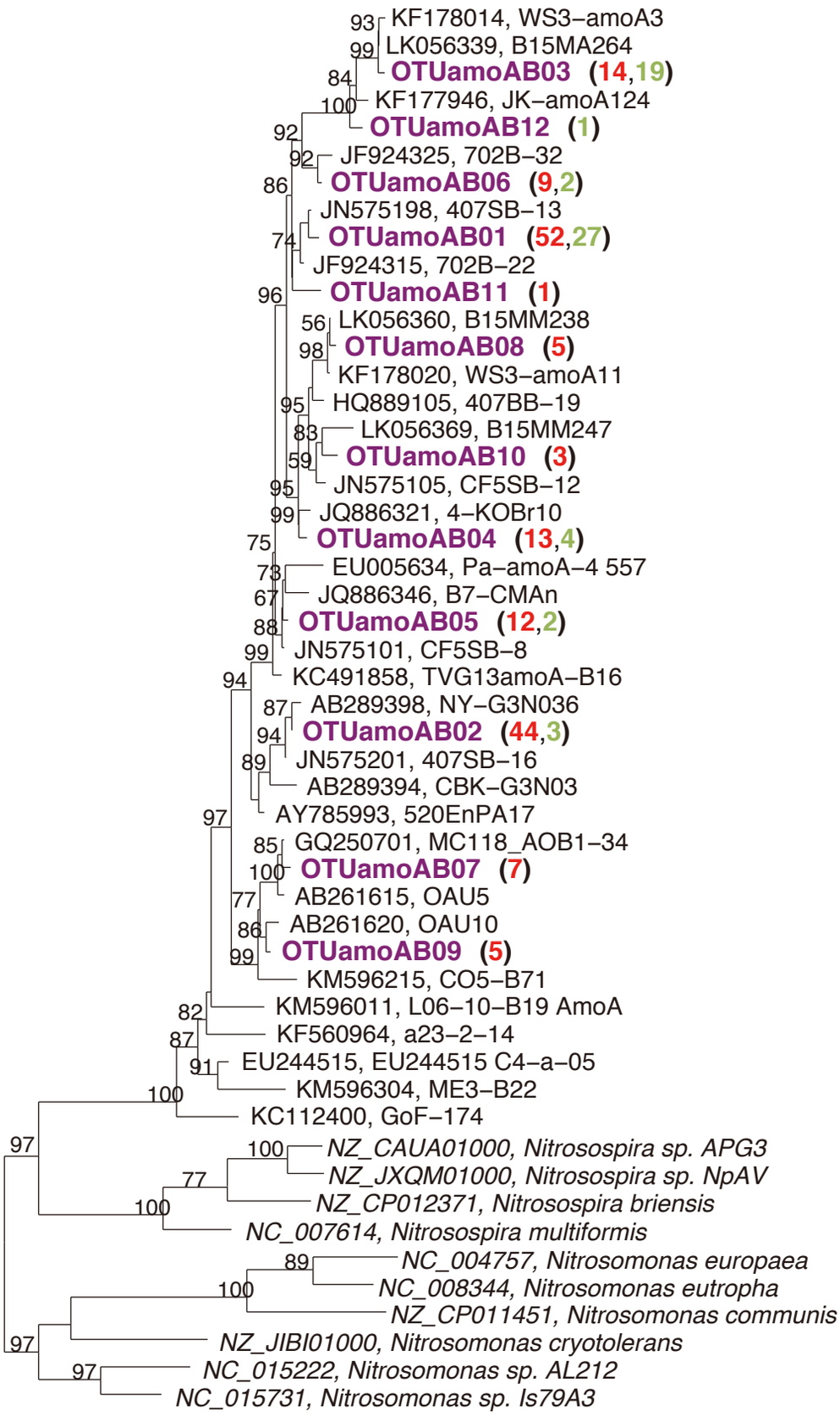

KF178014, WS3–amoA3
LK056339, B15MA264
OTUamoAB03 (14,19)
KF177946, JK–amoA124
OTUamoAB12 (1)
JF924325, 702B–32
OTUamoAB06 (9,2)
JN575198, 407SB–13
OTUamoAB01 (52,27)
JF924315, 702B–22
OTUamoAB11 (1)
LK056360, B15MM238
OTUamoAB08 (5)
KF178020, WS3–amoA11
HQ889105, 407BB–19
LK056369, B15MM247
OTUamoAB10 (3)
JN575105, CF5SB–12
JQ886321, 4–KOBr10
OTUamoAB04 (13,4)
EU005634, Pa–amoA–4 557
JQ886346, B7–CMAn
OTUamoAB05 (12,2)
JN575101, CF5SB–8
KC491858, TVG13amoA–B16
AB289398, NY–G3N036
OTUamoAB02 (44,3)
JN575201, 407SB–16
AB289394, CBK–G3N03
AY785993, 520EnPA17
GQ250701, MC118_AOB1–34
OTUamoAB07 (7)
AB261615, OAU5
AB261620, OAU10
OTUamoAB09 (5)
KM596215, CO5–B71
KM596011, L06–10–B19 AmoA
KF560964, a23–2–14
EU244515, EU244515 C4–a–05
KM596304, ME3–B22
KC112400, GoF–174
NZ_CAUA01000, Nitrosospira sp. APG3
NZ_JXQM01000, Nitrosospira sp. NpAV
NZ_CP012371, Nitrosospira briensis
NC_007614, Nitrosospira multiformis
NC_004757, Nitrosomonas europaea
NC_008344, Nitrosomonas eutropha
NZ_CP011451, Nitrosomonas communis
NZ_JIBI01000, Nitrosomonas cryotolerans
NC_015222, Nitrosomonas sp. AL212
NC_015731, Nitrosomonas sp. Is79A3
0.10

Fig. S6A

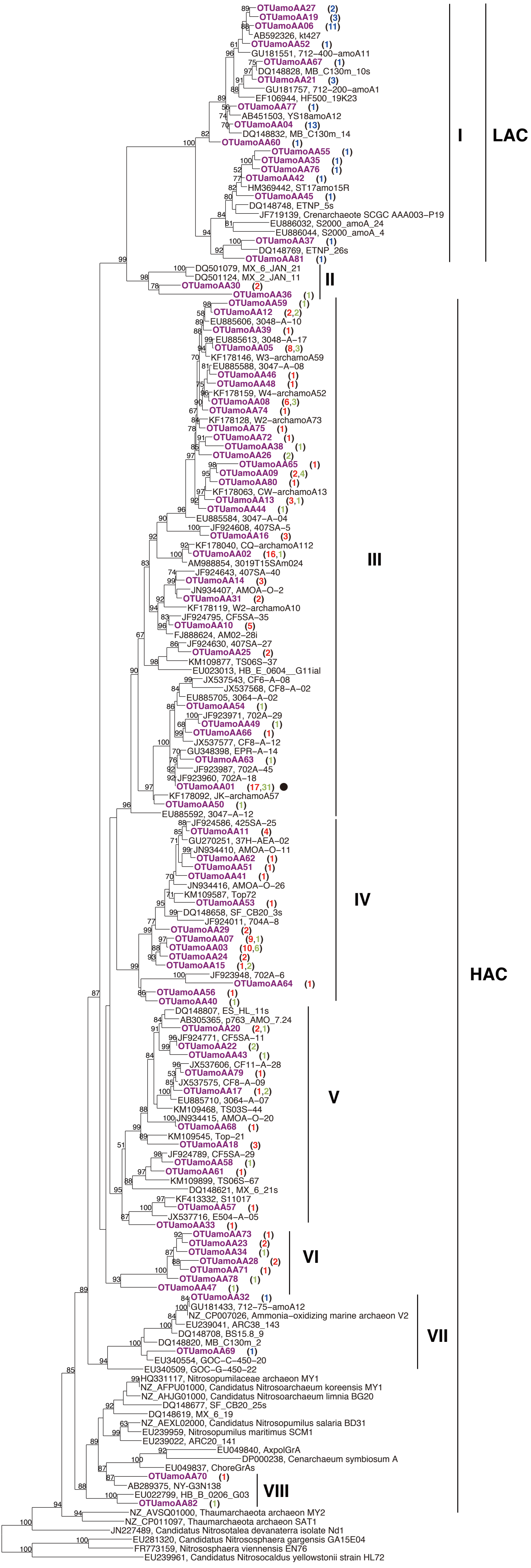

OTUamoAA27 (2)
OTUamoAA19 (3)
OTUamoAA06 (11)
AB592326, kt427
OTUamoAA52 (1)
GU181551, 712–400–amoA11
OTUamoAA67 (1)
DQ148828, MB_C130m_10s
OTUamoAA21 (3)
GU181757, 712–200–amoA1
EF106944, HF500_19K23
OTUamoAA77 (1)
AB451503, YS18amoA12
OTUamoAA04 (13)
DQ148832, MB_C130m_14
OTUamoAA60 (1)
OTUamoAA55 (1)
OTUamoAA35 (1)
OTUamoAA76 (1)
OTUamoAA42 (1)
HM369442, ST17amo15R
OTUamoAA45 (1)
DQ148748, ETNP_5s
JF719139, Crenarchaeote SCGC AAA003–P19
EU886032, S2000_amoA_24
EU886044, S2000_amoA_4
OTUamoAA37 (1)
DQ148769, ETNP_26s
OTUamoAA81 (1)
DQ501079, MX_6_JAN_21
DQ501124, MX_2_JAN_11
OTUamoAA30 (2)
OTUamoAA36 (1)
OTUamoAA59 (1)
OTUamoAA12 (2,2)
EU885606, 3048–A–10
OTUamoAA39 (1)
EU885613, 3048–A–17
OTUamoAA05 (8,3)
KF178146, W3–archamoA59
EU885588, 3047–A–08
OTUamoAA46 (1)
OTUamoAA48 (1)
KF178159, W4–archamoA52
OTUamoAA08 (6,3)
OTUamoAA74 (1)
KF178128, W2–archamoA73
OTUamoAA75 (1)
OTUamoAA72 (1)
OTUamoAA38 (1)
OTUamoAA26 (2)
OTUamoAA65 (1)
OTUamoAA09 (2,4)
OTUamoAA80 (1)
KF178063, CW–archamoA13
OTUamoAA13 (3,1)
OTUamoAA44 (1)
EU885584, 3047–A–04
JF924608, 407SA–5
OTUamoAA16 (3)
KF178040, CQ–archamoA112
OTUamoAA02 (16,1)
AM988854, 3019T15SAm024
JF924643, 407SA–40
OTUamoAA14 (3)
JN934407, AMOA–O–2
OTUamoAA31 (2)
KF178119, W2–archamoA10
JF924795, CF5SA–35
OTUamoAA10 (5)
FJ888624, AM02–28i
JF924630, 407SA–27
OTUamoAA25 (2)
KM109877, TS06S–37
EU023013, HB_E_0604__G11ial
JX537543, CF6–A–08
JX537568, CF8–A–02
EU885705, 3064–A–02
OTUamoAA54 (1)
JF923971, 702A–29
OTUamoAA49 (1)
OTUamoAA66 (1)
JX537577, CF8–A–12
GU348398, EPR–A–14
OTUamoAA63 (1)
JF923987, 702A–45
JF923960, 702A–18
OTUamoAA01 (17,31)
KF178092, JK–archamoA57
OTUamoAA50 (1)
EU885592, 3047–A–12
JF924586, 425SA–25
OTUamoAA11 (4)
GU270251, 37H–AEA–02
JN934410, AMOA–O–11
OTUamoAA62 (1)
OTUamoAA51 (1)
OTUamoAA41 (1)
JN934416, AMOA–O–26
KM109587, Top72
OTUamoAA53 (1)
DQ148658, SF_CB20_3s
JF924011, 704A–8
OTUamoAA29 (2)
OTUamoAA07 (9,1)
OTUamoAA03 (10,6)
OTUamoAA24 (2)
OTUamoAA15 (1,2)
JF923948, 702A–6
OTUamoAA64 (1)
OTUamoAA56 (1)
OTUamoAA40 (1)
DQ148807, ES_HL_11s
AB305365, p763_AMO_7.24
OTUamoAA20 (2,1)
JF924771, CF5SA–11
OTUamoAA22 (2)
OTUamoAA43 (1)
JX537606, CF11–A–28
OTUamoAA79 (1)
JX537575, CF8–A–09
OTUamoAA17 (1,2)
EU885710, 3064–A–07
KM109468, TS03S–44
JN934415, AMOA–O–20
OTUamoAA68 (1)
KM109545, Top–21
OTUamoAA18 (3)
JF924789, CF5SA–29
OTUamoAA58 (1)
OTUamoAA61 (1)
KM109899, TS06S–67
DQ148621, MX_6_21s
KF413332, S11017
OTUamoAA57 (1)
JX537716, E504–A–05
OTUamoAA33 (1)
OTUamoAA73 (1)
OTUamoAA23 (2)
OTUamoAA34 (1)
OTUamoAA28 (2)
OTUamoAA71 (1)
OTUamoAA78 (1)
OTUamoAA47 (1)
OTUamoAA32 (1)
GU181433, 712–75–amoA12
NZ_CP007026, Ammonia–oxidizing marine archaeon V2
EU239041, ARC38_143
DQ148708, BS15.8_9
DQ148820, MB_C130m_2
OTUamoAA69 (1)
EU340554, GOC–C–450–20
EU340509, GOC–G–450–22
HQ331117, Nitrosopumilaceae archaeon MY1
NZ_AFPU01000, Candidatus Nitrosoarchaeum koreensis MY1
NZ_AHJG01000, Candidatus Nitrosoarchaeum limnia BG20
DQ148677, SF_CB20_25s
DQ148619, MX_6_19
NZ_AEXL02000, Candidatus Nitrosopumilus salaria BD31
EU239959, Nitrosopumilus maritimus SCM1
EU239022, ARC20_141
EU049840, AxpolGrA
DP000238, Cenarchaeum symbiosum A
EU049837, ChoreGrAs
OTUamoAA70 (1)
AB289375, NY-G3N138
EU022799, HB_B_0206_G03
OTUamoAA82 (1)
NZ_AVSQ01000, Thaumarchaeota archaeon MY2
NZ_CP011097, Thaumarchaeota archaeon SAT1
JN227489, Candidatus Nitrosotalea devanaterra isolate Nd1
EU281320, Candidatus Nitrososphaera gargensis GA15E04
FR773159, Nitrososphaera viennensis EN76
EU239961, Candidatus Nitrosocaldus yellowstonii strain HL72
I
II
III
IV
V
VI
VII
VIII
LAC
HAC

Fig. S6B