Figure F1. Operations and core recovery, Expedition 359. Eight sites (U1465–U1472) were drilled using the APC, XCB, and RCB systems. Five sites were logged. Percentages at bottom of holes are core recovery (Table **T1**). See **Operations** in the Site U1471 chapter (Betzler et al., 2017) for more information on MDHDS testing. mbsl = meters below sea level, NA = not applicable.

Figure F2. Lithostratigraphy and correlation of Expedition 359 northern transect sites with sequence boundaries. HSGR = variations of gamma ray intensity from downhole logs, NGR = variations of gamma ray intensity measured on the cores. Arag = aragonite, Dol = dolomite. This figure is available in an **oversized format**.

Figure F3. Lithostratigraphy and correlation of Expedition 359 southern transect sites with sequence boundaries. This figure is available in an **oversized format**.

Figure F4. Location map of the Maldives in the central equatorial Indian Ocean. The Maldives carbonate platform consists of 22 atolls on the Laccadive–Maldives Ridge, a volcanic ridge that formed when the Indian plate moved over the Réunion hotspot.

Figure F5. Location map of Expedition 359 sites in the Inner Sea of the Maldives with line plan of site survey seismic lines for ARI 1, an existing industrial well that served for preexpedition seismic stratigraphic interpretation.

Figure F6. Sketch of the Maldives carbonate platform stratigraphy (after Betzler et al., 2013a). The volcanic basement is overlain by Eocene and Oligocene neritic carbonates. During the Oligocene, the platform areas shrank and two north-south–trending carbonate banks developed. During the Miocene, shallow-water carbonate banks partly drowned, whereas other platform areas grew further on. Contemporaneously, the carbonate platform was affected by an intensification of currents, as registered by the onset of widespread drift sedimentation in the Inner Sea of the Maldives. The research strategy for Expedition 359 was to drill two transects of sites from the inner part of the drowned platforms toward the Inner Sea, coring the platforms and the drifts.

Figure F7. Expedition 359 northern transect with location of sites placed on the western part of seismic Line NEOMA-P65 (vertical exaggeration = 6×) running west–east through northern Kardiva Channel with sequence stratigraphic interpretation (Betzler et al., 2013a; Lüdmann et al., 2013) and age assignments.

Figure F8. Expedition 359 southern transect with location of sites along seismic Line NEOMA-P62 (vertical exaggeration = 6×) running west–east through southern Kardiva Channel. The position of Site U1472 is projected onto the line; the site is located 400 m north of the line.

Figure F9. Geopetal infill (359-U1465A-11X-CC, 5–9 cm). A. Unit II floatstone facies with abundant bioclastic molds, some with geopetal infill (red frame). B. Close-up of geopetal infill in a mold (red frame = contact between original rock and infill). Two different generations of geopetal infill are different brown shades. The uppermost part of the infill displays evidence of bioerosion. C. Close-up of contact between original rock and geopetal infill. Contact surface shows extensive dolomitization marked by sucrosic dolomite. Small planktonic foraminifers (P) floating in a micritic matrix, locally showing porostromate structures, are present in the infill.

Figure F10. Benthic foraminifers from Units II and III, Hole U1465A. A, B. *Nummulites* sp. (11X-CC, 29–31 cm). C. *Amphistegina* sp. (23R-1, 21–25 cm). D. *Heterostegina* sp. and *Nummulites* sp. (21R-1, 83–86 cm). E. *Lepidocyclina* sp. (21R-1, 83–86 cm). F. *Miogypsina* sp. (23R-1, 21–25 cm).

Figure F11. Relative concentrations of aragonite, HMC, LMC, dolomite, and quartz measured using XRD, Site U1465. Horizontal dotted line = depth of the drowned platform top as inferred by the disappearance of aragonite.

Figure F12. Seismic section showing the drowned Kardiva platform and the onlap and burial by drift sequences, Site U1465. Site U1465 is situated to retrieve the drowned platform carbonates and overlying drift sediments, and Site U1466 is positioned east of the drowned platform edge to retrieve the early Miocene basinal sediments, the bottomsets of the prograding platform, the onset and the drift succession. Dark blue line = horizon between platform and drift sequences. O/M = Oligocene/Miocene boundary.

Figure F13. Fine-grained packstone with common planktonic foraminifers, a few benthic foraminifers, some mollusk fragments, and abundant bioclasts in a micritic, partially recrystallized, and dolomitic matrix (359-U1466A-50X-CC, 30–33 cm; 317.72 mbsf).

Figure F14. Alternation of black organic-rich and white chalk, Subunit VIIB (359-U1446B-56R-1 [top = 789.60 mbsf] and 56R-2).

Figure F15. Age-depth profile, Site U1466. L = last occurrence, F = first occurrence. *G.*rp = *Globigerinoides ruber* pink, *E.h* = *Emiliania huxleyi*, *P.l* = *Pseudoemiliania lacunosa*, *G.f* = *Globigerinoides fistulosus*, *D.b* = *Discoaster brouweri*, *D.p* = *Discoaster pentaradiatus*, *G.l* = *Globorotalia limbata*, *D.a* = *Dentoglobigerina altispira*, *S.a* = *Sphenolithus abies*, *D.q* = *Discoaster quinqueramus*, *G.d* = *Globoquadrina dehiscens*, *C.n* = *Coronocyclus nitescens*, *F.f* = *Fohsella fohsi*, *S.h* = *Sphenolithus heteromorphus*, *O.s* = *Orbulina suturalis*, *S.p* = *Sphenolithus pseudoheteromorphus*, *P.k* = *Paragloborotalia kugleri*, *S.d* = *Sphenolithus delphix*.

Figure F16. Plate of selected planktonic foraminifers, Site U1466. 1. *Globigerinoides ruber* pink (two specimens on the left) and white (one specimen on the right). 2, 3. *Globorotalia limbata*. 4. *Orbulina suturalis*. 5, 6. *Globorotalia truncatulinoides*. 7. *Praeorbulina sicana*. 8. *Dentoglobigerina altispira*. 9. *Pulleniatina obliquiloculata*. 10, 11. *Paragloborotalia kugleri*. 12. *Globigerinatella insueta*. 13. *Globigerinoides fistulosus*. 14, 15. *Fohsella fohsi*. Scale bars = 250 µm, except where otherwise indicated.

Figure F17. Relative concentrations of aragonite, calcium, dolomite, and quartz measured using XRD, Site U1466. Depths of dolomite peaks are indicated.

Figure F18. Physical property measurements, Site U1466. As in all sites porosity is very high close to sea surface and although it decreases with depth it remains high to the bottom of the core, ~40%. The constant grain density reflects the consistently high carbonate mineralogy. Bulk density = GRA density from the WRMSL and discrete wet bulk density. Porosity was measured using moisture and density (MAD) mass/volume Method C. PWC = *P*-wave caliper.

Figure F19. Correlation of seismic, core, and log data, Site U1466. Seismic Line 65 (M74) is shown with bases of platform and drift sequences. PWC = velocity measured on half cores and discrete samples. Interval velocity = model for time-depth conversion.

Figure F20. Age-depth profile, Site U1467. The age constraint for the base of the recovered sediments from <13.3–13.4 Ma is based on several reliable events which must occur below the base of Hole U1647C. The green dotted correlation line and sedimentation rates are based on biostratigraphic data alone, and magnetostratigraphic data has been added to show good coherence between these data sources. Plotted paleomagnetic events are chron tops. L = last occurrence, F = first occurrence. *G.*rp = *Globigerinoides ruber* pink, *E.h* = *Emiliania huxleyi*, *P.l* = *Pseudoemiliania lacunosa*, S *sG* = Start small *Gephyrocapsa* event, *C.m* = *Calcidiscus macintyrei*, *G.f* = *Globigerinoides fistulosus*, *D.b* = *Discoaster brouweri*, *G.limbata* = *Globorotalia limbata*, *D.p* = *Discoaster pentaradiatus*, *D.a* = *Dentoglobigerina altispira*, *S.a* = *Sphenolithus abies*, *G.m* = *Globorotalia margaritae*, *R.p* = *Reticulofenestra pseudoumbilicus*, *D.q* = *Discoaster quinqueramus*, *G.d* = *Globoquadrina dehiscens*, *N.a* = *Nicklithus amplificus*, *G. lenguaensis* = *Globorotalia lenguaensis*, S *sR* = Start small *Reticulofenestra* event, *P.m* = *Paragloborotalia mayeri*, *F.f* = *Fohsella fohsi*, *C.n* = *Coronocyclus nitescens*.

Figure F21. Concentrations of Cl^-, Holes U1467A–U1467C. The excursion at 100 mbsf may be a relict signal related to the last glacial period, when salinity was altered as a result of Northern Hemisphere glaciation.

Figure F22. Triple combo logs, Hole U1467E. Note that downhole logs are on the logging depth scale, whereas the natural gamma ray (NGR), density and porosity (MAD), and magnetic susceptibility (WRMSL = gray dots; point magnetic susceptibility [MSP] = blue dots) core data from Holes U1467B and U1467C and core recovery are on the core depth scale. HRLA: R3 = medium resistivity, R5 = deepest resistivity, RT = true resistivity, modeled from all depths of investigation.

Figure F23. *Amphistegina* sp. grainstone (359-U1468A-7H-2, 48–50 cm): 1 = *Amphistegina* sp., 2 = red algal debris. Fossils and clasts are cemented together by sparry cements. A. Plane-polarized light (PPL). B. Cross-polarized light (XPL).

Figure F24. Unit II, Hole U1468A. A. Fining-upward layers from very coarse grained rudstone to fine-grained packstone with an erosional surface at each layer (17F-1, 47–68 cm). The top of this section is the Subunit IIA/IIB boundary. B. Close-up of very coarse grained rudstone (17F-1, 56–65 cm; red line in A) showing large components (≈1 cm) such as rip-up clasts (arrow), large benthic foraminifers, echinoid spines, and extraclasts.

Figure F25. Light–dark alternations in coccolith-rich lower Miocene deposits (359-U1468A-99X).

Figure F26. Triple combo logs, Hole U1468B. Note that downhole logs are on the logging depth scale, and NGR and magnetic susceptibility (WRMSL and MSP) core data from Hole U1466A and core recovery are on the core depth scale. HSGR = standard (total) gamma ray, GR EDTC = total gamma ray from EDTC. HRLA: R3 = medium resistivity, R5 = deepest resistivity, RT = true resistivity, modeled from all depths of investigation.

Figure F27. Seismic section of Site U1468 displaying the thick drift succession (DS1–DS10) above the inclined bottomsets of the drowned Kardiva platform (PS1–PS11). A wavy reflection pattern at ~1100 ms TWT marks the onset of the current-dominated sedimentation in the Inner Sea and is the base of DS1. O/M = horizon interpreted by Belopolsky and Droxler (2004b) as the Oligocene/Miocene boundary. DS1 (dark blue) marks the base of the current-controlled sedimentation in the Inner Sea.

Figure F28. Unit II/III boundary (359-U1469B-4R). A. Transition from white foraminiferal rudstone (Unit II) to grayish brown dolomitized floatstone (dolostone) (Unit III). 1 = boring, 2 = coral fragment. B. Bioclastic grainstone with benthic foraminifers (Unit II). C. Dolomitized floatstone (Unit III). 3 = encrusting red algae, 4 = coral fragment.

Figure F29. Correlation of seismic and core data, Site U1469. Seismic Line 32 (SO236) is shown with the platform and drift sequences. The few recovered rocks yielded some bulk density information. Interval velocity profile is taken from Site U1465.

Figure F30. Age-depth plot, Site U1470. L = last occurrence, F = first occurrence. *G.r*p = *Globigerinoides ruber* pink, *E.h* = *Emiliania huxleyi*, *P.l* = *Pseudoemiliania lacunosa*, S *sG* = Start small *Gephyrocapsa* event, *G.f* = *Globigerinoides fistulosus*, *D.b* = *Discoaster brouweri*, *G.l* = *Globorotalia limbata*, *D.p* = *Discoaster pentaradiatus*, *D.a* = *Dentoglobigerina altispira*, *S.a* = *Sphenolithus abies*, *G.d* = *Globoquadrina dehiscens*.

Figure F31. IW Cl^-, Na^+, K^+, and SO_4^{2-} concentrations, Hole U1470A. Concentrations of major anions and cations display near constant and close to seawater values, although changes in carbonate mineralogy occur in the same interval. This pattern was observed at several other sites during Expedition 359 and might be the result of massive advection that dilutes the signature of diagenesis in the pore water of highly porous drift sediment.

Figure F32. Correlation of seismic and core data, Site U1470. Seismic Line 32 (SO236) is shown with the platform and drift sequences. Interval velocity is used for the time-depth conversion.

Figure F33. Components, porosity, and cementation of packstone in Unit V (359-U1471A-38X-1). Degraded foraminifers punctuated by (1) intraparticle, (2) moldic, and (3) interconnected vuggy porosity. Pore space is partially filled by (4) celestine (blue color; arrow). A. PPL. B. XPL.

Figure F35. Relative concentrations of aragonite, HMC, LMC, dolomite, and quartz measured using XRD, Site U1471.

Figure F34. Sedimentary features in Unit VIII. A. Alternations between white and dark gray layers (359-U1471E-35R-3). B. Glauconitic rims around burrows (arrow) (34R-6). C. Fine pseudo-lamination structure (36R-2). Insert shows discontinuous internal structure, possibly tapered and flattened burrows.

Figure F36. Components of Unit I. A. Unlithified floatstone with grainstone matrix (359-U1472A-4H-1, 3–46 cm). Red box = area in B. B. Unlithified floatstone with large components such as a solitary coral (detail shown in C), intraclasts, echinoid fragments, and mollusk fragments (4H-1, 35.5–45.5 cm). C. Solitary coral.