

**Figure F1.** Location map and local bathymetry, Site U1490 (from Doyongan and Fernando, 2021).

**Figure F2.** Tropical radiolarian biozones and key bioevents for Middle to Lower Miocene as defined by Riedel and Sanfilippo (1978), Nigrini et al. (2006), and Kamikuri (2019b, 2022) and calcareous nannofossil biozones of Backman et al. (2012) and Martini (1971). Geomagnetic polarity reversal events are also shown for calibration.

**Figure F3.** Age-depth model between ~200 and 350 m CSF-A based on paleomagnetic reversal events and planktonic foraminifer, calcareous nannofossil, and radiolarian bioevents, Site U1490.

**Plate P1.** Radiolarians, Hole U1490A. 1, 2. *Spongasteriscus marylandicus* (Martin) (41X-CC). 3–7. *Dictyocoryne malagaense* (Campbell and Clark) (3, 4, 6, 7: 23H-CC; 5: 25H-CC). 8, 11. *Polysolenia spinosa* group (Haeckel) (8: 23H-CC; 11: 20H-CC). 9. *Polysolenia glebulenta* Bjørklund and Goll (31F-CC). 10. *Polysolenia* sp. A (20H-CC). 12. *Stephanastrum* sp. A (35X-CC). 13. *Siphonosphaera* sp. A (27H-CC). 14. *Disolenia* sp. A (20H-CC). 15, 16. *Disolenia* spp. (23H-CC). 17. *Haliomma* sp. A (41X-CC). 18. *Eccentrodiscus* sp. A (41X-CC). 19. *Haliphormis aculeata* (Campbell and Clark) (35X-CC). 20, 21. *Stylactrona* sp. A (41X-CC). 22. *Heliodiscus grottensis* Stöhr (25H-CC). 23. *Heliodiscus* sp. A (25H-CC). 24. *Haliomma dedondoensis* group (Nakaseko) (35X-CC).

**Plate P2.** Radiolarians, Hole U1490A. 1, 2, 4. *Didymocyrtis prismatica* (Haeckel) (1, 2: 41X-CC; 4: 35X-CC). 3, 5. *Didymocyrtis tubaria* (Haeckel) (3: 27H-CC; 5: 31F-CC). 6–8. *Didymocyrtis bassanii* (Carnevale) (35X-CC). 9. *Didymocyrtis cf. laticonus* (Riedel) (23H-CC). 10. *Stylodictya* sp. A (35X-CC). 11. *Stylodictya tenuispina* group Jørgensen (35X-CC). 12–15. *Lithelius haekelispiralis* Matsuzaki and Suzuki (31F-CC). 16. *Larcopyle buetschlii* Dreyer (23H-CC). 18. *Lithelius hayesi* (Chen) (41X-CC). 19. *Phorticium* sp. A. (35X-CC). 20, 21. *Phorticium cf. scitulum* Zhang and Suzuki (20: 25H-CC; 21: 23H-CC).

**Plate P3.** Radiolarians, Hole U1490A. 1, 2. *Cyrtocapsella cornuta* (Haeckel) (1: 27H-CC; 2: 31F-CC). 3, 4. *Cyrtocapsella tetrapera* (Haeckel) (35X-CC). 5, 6. *Theocorythium spongoconus* Kling (31F-CC). 7. *Theocorythium* sp. A (25H-CC). 8, 30. *Siphocampe nodosaria* Haeckel (8: 35X-CC; 30: 41H-CC). 9. *Cyrtocapsella elongata* (Nakaseko) (25H-CC). 10. *Stichocorys johnsoni* (Caulet) (23H-CC). 11, 12. *Stichocorys diaphanes* (Sanfilippo et al.) (35X-CC). 13. *Stichocorys wolffii* Haeckel (25H-CC). 14–18. *Stichocorys delmontensis* (Campbell and Clark) (14: 31F-CC; 15–17: 25H-CC; 18: 23H-CC). 19–21. *Lithocampe subligata* Stöhr (41X-CC). 22. *Lamprocyclas* sp. B sensu Kamikuri (31F-CC). 23, 31. *Phormocyrtis alexandrae* (41X-CC). 24. *Tricolocapsa* sp. A (41X-CC). 25. *Tricolocapsa* sp. B (41H-CC). 26, 27. *Siphocampe* sp. B (41X-CC). 28. *Siphocampe* sp. C (41X-CC). 29. *Pyllobotrys disolenia* Haeckel (35X-CC). 32, 33. *Eucyrtidium cienkowskii* Haeckel (32: 27H-CC; 33: 35X-CC). 34. *Eucyrtidium* sp. aff. *inflatum* Kling (41X-CC). 35. *Artostrobus semazen* Renaudie and Lazarus (41X-CC).

**Plate P4.** Radiolarians, Hole U1490A. 1, 2. *Calocyclus costata* Riedel (25H-CC). 3. *Calocyclus serrata* (Moore) (34X-CC). 4. *Calocyclus virginis* Haeckel (35X-CC). 5. *Theocorythium annosa* (Riedel) (39X-CC). 6. *Artophormis gracilis* (Riedel) (39X-CC). 7, 8. *Carpocanopsis cingulata* (Riedel and Sanfilippo) (26H-CC). 9. *Trissocyclus stauroporus* (Haeckel, 1887) (26H-CC). 10. *Calocyclus caepa* Moore (31F-CC). 11. *Anthocyrtidium achillis* Haeckel (35X-CC). 12. *Anthocyrtidium* sp. A (35X-CC). 13. *Tholospyris mammillaris* (Haeckel) (27H-CC). 14–18. *Tholospyris* spp. (14: 23H-CC; 15, 16, 18: 25H-CC; 17: 41X-CC). 19, 20. *Dendrospyris* aff. *bursa* sensu Sanfilippo and Riedel (19: 31F-CC; 20: 25H-CC). 21. *Dendrospyris* sp. A (41X-CC). 22. *Dendrospyris* sp. B (41X-CC).

**Plate P5.** Radiolarians, Hole U1490A. 1. *Dorcadospyris simplex* (Riedel) (31F-CC). 2. *Dorcadospyris ateuchus* (Ehrenberg) (31F-CC). 3, 4, 6, 8. *Lychnocanoma elongata* (Vinassa de Regny) (3, 4: 41X-CC; 6, 8: 31F-CC). 5. *Dorcadospyris alata* (Riedel) (24H-CC). 7, 9. *Lychnocanoma* sp. A (35X-CC).