**Micropaleontological determinations**

All localities sampled by P. Maurizot and determinations by Eradata (cf. references list).

Section 1 to 5 determinations in thin sections. Sections 6 determinations on specimen extracted by washing of soft material.

**1 - Base of Table Unio section:**

Sample 2003PM381, 165°36’31”E, 21°33’23”S, radiolarian black silicified siltstone, Eradata 2004.

Planktonic foraminifera: *Globotruncana* sp., *Planoglobulina* *acervulinoides* (EGGER).

Radiolarians: *Amphipyndax* *tylobus* FOREMAN, *Myllocercion* *acineton* EMPSON – MORIN, *Pseudoaulophacus* *pargueraensis* PESSAGNO, *P.* *floresensis* PESSAGNO, *Theocapsomma* *comys* FOREMAN.

Late Campanian to Maastrichtian interval.

**2 - Mont Rembaï section:**

Sample 2003PM411, 165°50’36”E, 21°35’37”s, clast of black chert, Eradata 2004.

Planktonic foraminifera: *Contusotruncana* *patelliformis* (GANDOLFI), *Globotruncana* *hilli* PESSAGNO, *Heterohelix* *striata* (EHRENBERG), *Pseudoguembelina* *costulata* (CUSHMAN), *Pseudotextularia* *nuttalli* (VOORWIJK), *Radotruncana* *calcarata* (CUSHMAN), *Archaeoglobigerina* sp., *Rugoglobigerina* sp.*.*

Late Campanian *Radotruncana* *calcarata* biozone.

**3 – Table Unio section (continued):**

Sample 2003PM373, 165°46’40”E, 21°33’35”S, black silty argillite, Eradata 2004.

Sample 2003PM374, 165°46’40”E, 21°33’36”S, biomicrite, Eradata 2004.

At the base of the section, the black silty argilites (2003PM373) yielded a planktic microfauna (this work) including *Globigerinatheka subconglobata* SHUTSKAYA, *Hantkenina liebusi* SHOKINA, and *Turborotalia* *cerroazulensis* (COLE) indicating a possible E8 to E13 zone range. However, the overlying biomicrite (2003PM374) provided species typical of the short *Orbulinoides beckmanni* E12 zone, with the index species together with *Acarinina bullbrooki* (BOLLI), *Guembelitrioides lozanoi* (COLOM), *Hantkenina* *liebusi* SHOKINA, *Morozovella spinulosa* (CUSHMAN), *M. crater* (FINLAY), *M. spinulosa* (CUSHMAN), *Truncorotaloides rohri* BRÖNNIMMAN & BERMUDEZ. This suggests that the base of the section could be constrained in the zone range E8 – E11, i.e. Lutetian to base of Bartonian (or lower Middle Eocene).

These levels are overlains by argillite and biomicrite layers (samples 2003PM375 and 2003PM376, 165°36’49”E, 21°33’28”S, biomicrite, Eradata report 55/05-04/CAL 12) with associations of the E14 to E15, i.e. Late Bartonian to Priabonian (or upper Middle to Late Eocene) with *Globigerinatheka* *semiinvoluta* (KEYJZER), *G.* *kugleri* (BOLLI, LOEBLICH & TAPPAN), *Hantkenina* *alabamensis* CUSHMAN.

The main limestone cliff contains abundant benthic foraminifera, however commonly fragmented and reworked, thus seldom identifiable at species level, and with low stratigraphic value (Sample 2003PM377, 165°46'40"E, 21°33'23"S to 2003PM380, 165°46'32"E, 21°33'21"S, grainstone, Eradata report 55/05-04/CAL 12). This includes at species level *Asterocyclina* *penuria* COLE, A. matanzensis COLE, *Heterostegina* *saipanensis* COLE, *Nummulites* *djokjokartae* (MARTIN), *Pellatispira* *inflata* UMBGROVE, *P. rutteni* UMBGROVE, *P. glabra* UMBGROVE, *Planorbulinella* *larvata* (PARKER & JONES); and at generic level *Actinocyclina* sp., *Amphistegina* sp., *Assilina* sp., *Asterocyclina* sp., *Discocyclina* sp., *Nummulites* spp., *Pellatispira* sp., *Sphaerogypsina* sp.. It is worth to add to this list the genus *Grzybowskia* mentionned in this same section (Gonord 1977, p. 195), not found in this work, but very common in the Uitoé Limestone of the same age (see below). A few broken planktic are entrapped and disseminated among the bioclasts, from base to top of the limestone unit. Among them are *Hantkenina alabamensis* CUSHMAN and *Subbotina gortanii* (BORSETTI), indicating firmly the E16 zone i.e. Late Priabonian (or uppermost Eocene). Some extraclasts of micrite with planktonic microfauna of Middle Eocene age are frequent.

Other planktic foraminifera very common throughout the whole section and highlighting the Middle to Late Eocene age range are *Subbotina eocaena* (GUMBEL), *S. utilisindex* (JENKINS), *Globigerinatheka index* (FINLAY), *G. senni* (BECKMANN), *Turborotalia cerroazulensis pomeroli* TOUMARKINE & BOLLI, *T. cerroazulensis cerroazulensis* (COLE), *T. cerroazulensis* (COLE) trans. *cocoaensis* (CUSHMAN), *T. cerroazulensis cocoaensis* CUSHMAN, *T. cunialensis* (TOUMARKINE & BOLLI).

**4 – Mont Rembaï section (continued):**

Samples 2003PM403, 165°50'46"E, 21°35'8"S to 2003PM406, 165°50'48"E, 21°35'51"S, biomicrite, Eradata 2004.

Samples yielded planktonic foraminifera indicating an E10-15 zone range with *Chiloguembelina cubensis* (PALMER), *Globigerinatheka index* (FINLAY), *G. senni* (BECKMANN), *Hantkenina* *alabamensis* CUSHMAN, *H. liebusi* SHOKINA, *Morozovella crassata* (CUSHMAN), *M. crater* (FINLAY), *Subbotina eocaena* (GUMBEL), *S. linaperta* (FINLAY), *S. utilisindex* (JENKINS), *S. cryptomphala* (GLAESSNER), *Truncorotaloides rohri* BRÖNNIMANN & BERMUDEZ, *T. topilensis* (CUSHMAN), *Turborotalia cerroazulensis cerroazulensis* (COLE).

**5 – Uitoé Limestone, Nassirah area:**

Sample 2008PM592, 166°4'18"E, 21°47'11"S, sample 2008PM572, 166°3'11"E, 21°47'4"S, sample 2008PM576, 166°3'9"E, 21°47'17"S, sample 2008PM517, and 2008PM510, 166°0'53"E, 21°47'38"S, coralgal limestone, Eradata 2008a, b.

The benthic microfauna characterise a Bartonian to Priabonian age interval. It comprises *Asterocyclina* *praecipua* COLE, *A*. *penuria* COLE, *Austrotrillina* *asmariensis* ADAMS, *Biplanispira* *mirabilis* (UMGROVE), *Chapmanina* *gassinensis* SILVESTRI, *Discocyclina* *omphala* (FRITSCH), *Discogypsina* *saipanensis* (HANZAWA), *Fabiania* *cassis* (OPPENHEIM), *Grzybowskia* *jasoni* LUNT, *Halkyardia* *minima* LIEBUS, *Nuttallides* *truempyi* (NUTTALL), *Pellatipira* *inflata* UMBGROVE, *P*. *madarazi* (HANTKEN), *Sphaerogypsina* *globula* (REUSS).

The planktic foraminifera includes *Catapsydrax dissimilis* (CUSHMAN & BERMUDEZ), *Globoturborotalita martini* (BLOW & BANNER), *Paragloborotalia nana* (BOLLI), *P. mayeri* (CUSHMAN & ELLISOR), *Subbotina* *gortanii* (BORSETTI), *S*. *eocaena* (GÜMBEL), *S*. *corpulenta* (SUBBOTINA), *S*. *linaperta* (FINLAY), *S*. *angiporoides* (HORNIBROOK), *S*. *utilisindex* (JENKINS & ORR), *Turborotalia* *cocoaensis* (CUSHMAN), *T*. *cerroazulensis* (COLE) trans. *cocoaensis* CUSHMAN, *T. pomeroli* (TOUMARKINE & BOLLI), *T. ampliapertura* (BOLLI), *T. increbescens* (BANDY),.

**6 – Népoui - Koumac Group turbidites**

Eradata 2011.

Samples prepared by classical crushing, washing, and sieving of the soft material. The strata being highly disrupted, chaotic, and by place tightly folded, no log is provided. Samples are mudstone, grainstone, dolosparite, and dolomicrite. Only most productive samples are listed.

Koumac (Fig. S4.1)

2010PM486, 164°14'13"E, 20°32'38"S

2010PM487, 164°14'13"E, 20°32'38"S

2010PM492, 164°16'38"E, 20°34'42"S

2010PM493, 164°16'38"E, 20°34'43"S

2010PM495, 164°16'35"E, 20°34'46"S

2010PM497, 164°16'32"E, 20°34'46"S

2010PM503, 164°16'31"E, 20°34'44"S

2010PM504, 164°16'35"E, 20°34'42"S

2010PM517, 164°16'54"E, 20°34'38"S

2010PM518, 164°16'54"E, 20°34'38"S

Népoui (Fig. S4.2)

2010PM38, 164°59'4"E, 21°17'34"S

2004PM127, 164°59'11"E, 21°17'29"S

2004PM 129, 164°59'24"E, 21°18'46"S

2010PM137, 165°0'23"E, 21°18'9"S

2010PM215, 165°0'35"E, 21°18'27"S

2010PM222, 165°0'29"E, 21°19'8"S

2010PM661, 164°56'28"E, 21°16'37"S

2010PM666, 164°56'34"E, 21°17'27"S

2010PM668, 164°56'37"E, 21°17'27"S

2010PM669, 164°56'20"E, 21°17'24"S

2010PM670, 164°56'21"E, 21°17'24"S

2010PM677, 164°56'4"E, 21°17'23"S

2010PM682, 164°57'6"E, 21°16'49"S

The benthic foraminifera association corresponds to a mixture of forms of shallow carbonate platform, and deep ‘in situ’ origins.

Benthic from carbonate platform are at species level *Asterocyclina matanzensis* COLE, *Discogypsina saipanensis* (HANZAWA), *Discocyclina dispansa* SOWERBY, *Fabiania cassis* (OPPENHEIM), *F. saipanensis* COLE, *Grzybowskia jasoni* LUNT, *Halkyardia minima* LIEBUS, *Nummulites brongniarti* d’ARCHIAC & HAIME, an assemblage of Bartonian to Priabonian age, and an association similar to that of the Uitoé Limestone.

Deep benthic forms are abundant. At species level they are *Bolivina byramensis* CUSHMAN, *B. crenulata* CUSHMAN, *Bulimina semicostata* NUTTALL, *Chilostomella ovoidea* REUSS, *Cibicidina walli* BANDY, *Cibicidoides laurisae* (MALLORY), *C. eocaenus* (GÜMBEL), *C. truncanus* (GÜMBEL), *C. barnetti* (BERMUDEZ), *Fursenkoina halkyardi* (CUSHMAN), *Hoeglundina elegans* (d’ORBIGNY), *Nuttallides truempyi* (NUTTALL), *N. umbonifer* (CUSHMAN), *Planulina ambigua* (FRANZENAU), *P. costata* (HANTKEN), *Plectofrondicularia paucicostata* CUSHMAN & JARVIS, *Siphonina advena eocenica* CUSHMAN & APPLIN, *Siphonodosaria antillea* (CUSHMAN), *S. spinata* (CUSHMAN), *Sphaeroidina bulloides* d’ORBIGNY, *Uvigerina adelinensis* PALMER & BERMUDEZ, *U. eocaena* GÜMBEL, *U. havanensis* CUSHMAN & BERMUDEZ. At generic level they are *Abyssamina* sp., *Alabamina* spp., *Ammobaculites* sp., *Ammodiscus* sp., *Anomalinoides* sp., *Bolivina spp., Caucasina sp., Cibicidina* sp., *Dentalina* sp., *Fissurina* sp., *Hanzawaia* sp., *Hyperammina* sp., *Loxostomoides sp., Marginulina sp., Oridorsalis sp., Orthomorphina* sp., *Pleurostomella* sp., *Pyramidula sp., Quadrimorphina* sp., *Rectobolivina sp., Rhabdammina* spp., *Rhizammina* sp., *Saccorhiza sp., Siphonina spp., Sigmoilina sp.,* *Sphaeroidina sp.,* *Stilostomella* sp., *Trifarina* sp*., Triplana* sp..

The planktonic foraminifera association comprise *Catapsydrax dissimilis* (CUSHMAN & BERMUDEZ), *Chiloguembelina cubensis* (PALMER), *C. ototara* (FINLAY), *Cribrohantkenina inflata* HOWE, *Dentoglobigerina pseudovenezuelana* (BLOW & BANNER), *D. tripartita* KOCH, *D. galavisi* (BERMUDEZ), *Globigerina officinalis* SUBBOTINA, *Globigerinatheka index* (FINLAY), *G. tropicalis* (BLOW & BANNER), *Globigerinatheka index* (FINLAY), *G. luterbacheri* BOLLI, *G. subconglobata* (SHUTSKAYA), *Globoturborotalita anguliofficinalis* (BLOW), *G. ouachitaensis* (HOWE & WALLACE), *Hantkenina primitiva* CUSHMAN & JARVIS, *H. alabamensis* CUSHMAN, *H. nanggulanensis* HARTONO, *Pseudohastigerina micra* (COLE), *P. naguewichiensis* (MYATLIUK), *Subbotina crociapertura* BLOW, *S. gortanii* (BORSETTI), *S. eocaena* (GÜMBEL), *S. linaperta* (FINLAY), *S. utilisindex* (JENKINS & ORR), *S. hagni* (GOHRBANDT), *S. corpulenta* (SUBBOTINA), *S. angiporoides* (HORNIBROOK), *S. angiporoides minima* (JENKINS), *Tenuitella gemma* (JENKINS), *Turborotalia cunialensis* (TOUMARKINE & BOLLI), *T. cocoaensis* (CUSHMAN), *T. praequinqueloba* OLSSON & HEMLEBEN, *T. ampliapertura* (BOLLI), *T. pseudoampliapertura* (BLOW & BANNER), *T. cerroazulensis* (COLE), *T. increbescens* (BANDY), which characterize the E15 to E16 biozone interval (Middle to Late Priabonian).

Radiolarians include *Arthophormis barbadensis* (EHRENBERG), *A. gracilis* RIEDEL, *Cryptocarpium ornatum* (EHRENBERG), *Dictyoprora pirum* (EHRENBERG), *D. mongolfieri* (EHRENBERG), *D. armadillo* (EHRENBERG), *Eucyringium fistuligerum* (EHRENBERG), *Eucyrtidium hillaby* EHRENBERG, *Lithocyclia aristotelis* (EHRENBERG), *L. ocellus* (EHRENBERG), *L. stella* EHRENBERG, *L. angusta* (RIEDEL), *Lophocyrtis jacchia* (EHRENBERG), *L. (Cyclampterium) milowi* (RIEDEL & SANFILIPPO), *L. barbadense* (EHRENBERG), *Lychnocanoma amphitrite* FOREMAN, *Periphaena decora* EHRENBERG, *Theocyrtis tuberosa* RIEDEL, *Thyrsocyrtis rhizodon* EHRENBERG, *T. (Pentacorys) lochites* SANFILIPPO & RIEDEL, *Tristylospyris triceros* (EHRENBERG), *Zealithapium mitra* (EHRENBERG).They characterize the RP18 - RP19 biozones interval (Middle to Late Priabonian).

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