

## EXECUTIVE SUMMARY

The marine part of the Papua Niugini Expedition has involved a total of 88 science participants from 18 countries, plus 51 trainees, media, logistics and visitors. The expedition has been organized around two major facilities: the research vessel "Alis", and a large laboratory deployed on the campus of the Divine Word University.



In addition, a seafront facility was used for boat maintenance, dive shop and sieving area.



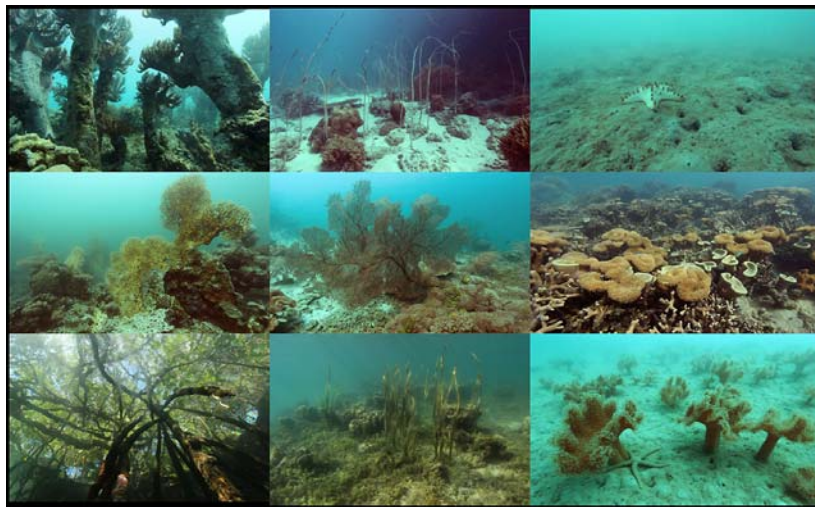
The coastal part has closed with 301 dives (249 PR, this includes many replicates; 39 PCT), 51 shore/freshwater sites (PM; includes replicates), 86 dredging series (PD; includes few replicates), 49 suction samples (PS) and 53 brushing baskets (PB), 14 sets of tangle nets (PP), and 42 grabs (PG). It is estimated that we filled somewhere near 1,700 tanks. Altogether, the coastal and deep-sea parts of the expedition consumed ca 2,000 liters of ethanol.

In addition, 27 ARMS were deployed for retrieval in November or December 2013.



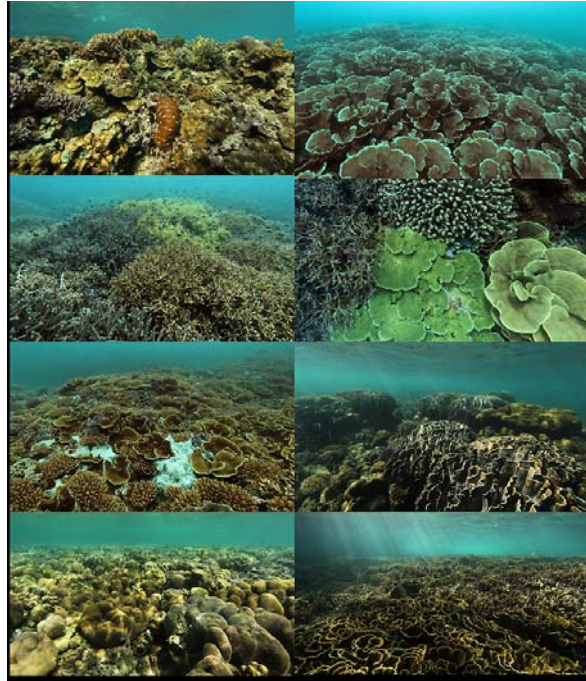
**The coastal part of the expedition** started with the habitat inventory and mapping component. Carried out from the R/V Alis during the first two weeks of the expedition, 39 stations (PCT stations) were visited by SCUBA and snorkelling, including Planet Rock.

From these 39 stations, spread throughout most of the Madang lagoon, a hierarchical typology of habitats is currently derived, considering that an habitat is defined by a series of geomorphological, benthic, architectural and taxonomic variables.



Examples of habitats characterized by different types of cover, architecture and dominant organisms

Considering the small size of the lagoon, and considering that some areas could not be visited because of community access issues, the level of habitat richness is high. Geomorphological layers include lagoon floors, coastal fringing reefs and enclosed basins sometimes fringed by mangroves, lagoonal patch reef flats and slopes, islet reef flats and slopes, subtidal barrier reef flat, intertidal barrier reef flat, barrier reef forereef and escarpment, and passes. On these coarse geomorphological strata, different communities dominated by corals, soft corals, seagrass, algae, gorgonians, and various substrates (sediments, pavement, rocks, eroded coral framework) define a second level of habitats and their attributes. A number of wrecks also define specific anthropogenic habitats which can attract different types of inhabitants. Finally, the dominant species and growth forms finish characterizing the hierarchy of habitats found in the Madang lagoon.



A variety of coral dominated habitats

From the collected information (transects, photographs), from additional taxonomic information (from Alis leg 2), and using a very high resolution satellite image, a habitat map is currently finalized. This will be the foundation to model biodiversity distribution and prioritise conservation zones in the Madang lagoon.

**In terms of species composition**, there is consensus among the scientists to observe that:

1. The Madang Lagoon fauna and flora is rich in species, but not exceptional given its location in the Coral Triangle;
2. Spatial heterogeneity is very high, many species are represented by singletons, and the inventory remains unsaturated despite the intensity of the survey;
3. A number of species that are normally common to abundant in the West Pacific are inexplicably absent; there are also instances of dwarfism as compared to the adult sizes normally attained by certain species.

## Flora

About 2.000 specimens of macroalgae have been sampled, representing ~300 species. Of these, at least 10 are morphologically distinctly new. The green calcified algae belonging to the genus *Halimeda* are well represented and some new cryptic species are expected. Within the brown algae, the Dictyotales are very abundant, especially *Dictyota*, *Dictyopteris* and *Padina*, with large populations in the lagoon. These algal blooms can be interpreted in some aspect as a result of algal overgrowing resulting from reef degradation. For the red algae the flora was less diverse than expected and most of the species were represented by very few specimens and in several cases only a single representative was collected. Most of the species reported by Coppejans 25 years ago from Madang area have been re-collected. A number of common species from the West Pacific region (coral triangle region), are absent in Madang but were observed by Coppenjans in the Sepik area. Overall, the algal vegetation (biomass) is characterized by few species which represent 80% of the algal coverage, while most of the taxa remain relatively rare.

Compared to the specimens collected in Madang Lagoon 25 years ago by Eric Coppejans, and kept in the herbarium of the University of Ghent, the specimens collected in 2012 appear to be miniature versions.



## Fauna

### Sponges

~200 species were sampled. This number is significantly lower than what would have been obtained from a comparable effort in East Kalimantan (350 species) or West Papua (400-500).

Due to problems of access, the enclosed marine lakes could not be studied.

### Corals

The presence and distribution of over 400 hard coral species was documented through non destructive photographic sampling throughout different reef habitats at 26 stations in the study area. Several species previously recorded as common in the region were not encountered. The overall impression was that of a very patchy distribution of most coral species, even within the kind of habitat where they are expected to occur. In fact, coral species records new for the expedition were found until the very last dive, thus suggesting that the sampling effort has likely been just for the kind of patchiness encountered in the study area.

Over 400 specimens have been sampled including (approximately 200 each for zooxanthellate and azooxanthellate taxa), two of which represent species new to science. Twenty-five taxa sampled, typically found only in the Coral Triangle, have previously never been investigated by means of an integrated morphological-molecular systematics approach.

### Crustaceans: Commensal Barnacles

About 110 samples were collected from a limited number of dives (6), representing at least 17 species of coral-associated barnacles and 5-6 species of sponge-associated barnacles. The dominant genera are *Cantellius* [left] and *Savignium* [right]. Compared to Taiwan, several coral species were here found to host barnacles, when they don't in Taiwan. Conversely, the genus *Galkinia*, quite common in Taiwan, is much less abundant in Madang.



### Crustaceans: Parasitic Copepods

83 species of parasitic/associate copepods have been sampled from fish, sea pens (pennatulids), nudibranchs and bivalves. Many probably represent new species.



*Creopelates* n. sp. on *Eviota* sp.



*Cardiodectes* n. sp. on *Pleurosicya* sp.

A remarkable parasite from the coelomic cavity of Triphoridae and Cerithiopsidae (gastropods) may represent an ascothoracid or a copepod. This association was previously unknown in gastropods.



Mystery crustacean parasite



Inside the cephalic haemocoel of a cerithiopsid

### Crustaceans: Decapods and Stomatopods

At least 1410 species of decapods and 43 of stomatopods have been sampled. Of these 1033 are crabs, lobsters, and anomurans (incl. galatheids, and pagurids), and 377 are thalassinids and shrimps.



*Banareia*



*Actaea* n. sp.

The diversity is very unbalanced, with most diversity in the crab families Xanthidae and Pilumnidae, and in the two shrimp groups Alpheidae (130 species) and Pontoniinae (144).

Nearly all species were photographed alive/fresh.



*Periclimenaeus pachydentatus*



*Paranchistus* sp.



Only 65 species of pontoniines were previously recorded from PNG (mostly from Kimbe Bay). The CReefs expedition to Lizard I. recorded ca 80; East Kalimantan has 90; and Nha Trang (Vietnam) has 120.

### Crustaceans: Amphipods

~238 species of gammarid amphipods have been sampled (vs 192 previously known from Madang). Note that this number does not include the fouling and mangrove species.

Of 34 "marker species" (in families living in sponges and tunicates, with highest rates of endemism) previously known from Madang, 33 have been recorded in 2012, plus another 12-14 species (of which 9-11 will most probably prove to be new species).

## Echinoderms

Holothurians:  $\geq 75$  species. This number is superior to that for Guam, and similar to that for Okinawa. Several new species have been noticed, although more were expected.

Ophiuroids:  $\sim 120$  species.

Echinoids: 35

Starfishes: 30

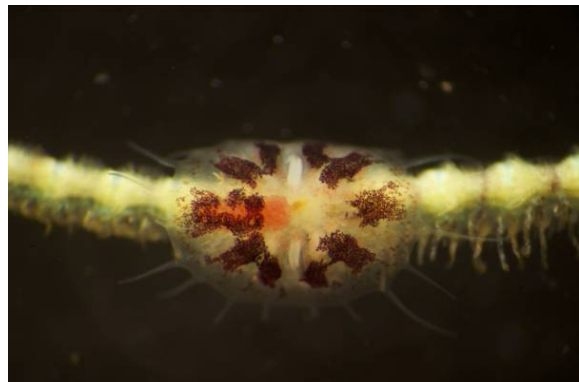
Crinoids: 60 species. Only 45 species were previously known from Madang Lagoon and all have been found again in 2012. In terms of abundance, Madang has been found to be an exceptionally good place for crinoids. In terms of diversity, the number of species is comparable to that obtained on Lizard Island, however as a result of 3 trips and many more dives.

Total echinoderms: 320 species.

The crinoids were particularly examined for associates and parasites, which resulted in 6 species of gastropods (Eulimidae), 20 decapods, 30 myzostomids, 4 scaleworms, 9 ophiuroids, 2 fish, 1 flatworm (new), 2 isopods and 3 amphipods.



Eulimid gastropods



Myzostomid annelid

## Molluscs: General

A total of 15,221 specimens of (mostly shelled) molluscs have been prepared for sequencing, representing  $3500 \pm 500$  species. It is estimated that 20 to 30% of the species sorted from residues were never taken alive, which suggests that the number of shelled molluscs sampled is in the order 4000 to 5000 species.

Overall, the Madang Lagoon fauna was found to be less diverse than expected. "Seashells" (i.e. gastropods in the collectable families) were found to be abnormally scarce, both in number of specimens and number of species. Many species of cowries that are common to abundant throughout the West Pacific are absent or very rare in the Madang Lagoon. This is obviously not a result of overcollecting, as there is no seashell collecting pressure in the area. The almost total absence of Cancellariidae was remarkable. Also, species of Terebridae and Strombidae were found to unusually small compared to the size they reach elsewhere in the West Pacific. Likewise, the family Potamididae - a typical "marker" of Coral Triangle mangroves - appears to be absent from the Madang area, with just one broken shell of *Terebralia palustris* found during the expedition. This may be linked with the near-absence of extensive estuarine mangroves and narrow tidal range on the coast of the Bismarck Sea.

On the positive side, there is a reasonably good diversity of turrids (~350 species tissue clipped), columbellids, galeommatids, fissurellids, cerithioids (~80 species) and vitrinellids. A fauna associated with sunken wood (*Idas*, *Xylophaga*) occurs in remarkably shallow water. Also of particular interest are 2 or 3 species of the slug genus *Aiteng*. Conversely, we found the Madang fauna comparatively poor in vetigastropods (notably scissurellids), triphorids and lower heterobranchs.

A total of 920 living mollusc specimens were photographed alive. Allowing for some intentional and non-intentional duplicates, this represents some 850 species. In addition, other species were photographed *in situ* that document special cases of associations and feeding behaviour.



*Aiteng*



Galeommatid with dwarf male





Marginellid parasitizing sleeping parrotfish



Epitoniid parasitizing a sea-anemone

### Molluscs: Opisthobranchs

369 species were sampled during the expedition. Of these, 86 were not known from Madang previously, and 67 are new species never seen anywhere before.



*Phyllidiella* n. sp.



*Risbecia* sp.

## Meiofauna

36 specimens (representing probably 2 species) of Nemertodermatida were found. One species was previously known from Madang, and only two are known for the whole Pacific.

All groups of mesopsammic molluscs except Platyhedyle have been found during the expedition. These include 4 species of Acochliidae (including what may be a new family?), 2 species of Rhodopemorpha, 2-3 nudibranchs (Embletonia, Pseudovermis), and a species Pelecyciidae.



*Acochlidium*



*Philinoglossa*

## Fishes

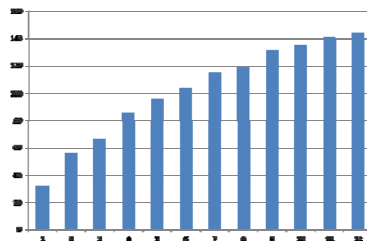
Fishes were inventoried mostly by visual census and more than 11,000 underwater photographs. Actual collecting was more limited. Although much information remains to be consolidated, the checklist already amounts to 1324 fish species after Leg 1 of Alis, with 268 new records for the region.

Six fish species are currently known only from Madang Lagoon: *Gogolia filewoodi* Compagno, 1973 (Triakidae), *Liopropoma incomptum* Randall & Taylor, 1988 (Serranidae), *Stalix dicra* Smith-Vaniz, 1989 and *S. eremia* Smith-Vaniz, 1989 (Opistognathidae), *Ecsenius collettei* Springer, 1972 (Blenniidae), and *Ptereleotris crossogenion* Randall & Suzuki, 2008 (Microdesmidae). Several probably new species, which probably include additional "endemic" (or narrow range) species, have been recognized from underwater photographs, but were regrettably not sampled and thus cannot be described.

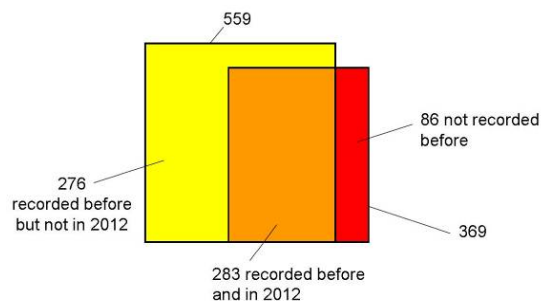
## Overall, species diversity

**Overall, species diversity** can be ranked as high, but not exceptional, with a surprising lack of a suite of common species.

Despite the intensity of our sampling, it is clear that saturation was not reached, as evidenced by the cumulation curve of pontonine shrimps (144 species) during the expedition.



Another interesting metrics is provided by the seaslugs. Special attention had been given to this group before, and based a total of 6 months in Madang in the 1980s to early 1990s, 559 species had previously been recorded. The total number for Madang is now 645, of which 57% have been seen in 2012.



Compared to the situation 20-25 years ago (late 1980s - early 1990s) at the time of the Christensen Research Institute, the diversity is probably very comparable. At that time, Madang became famous because Raja Ampat had not then been discovered, and the Panglao and Santo expeditions had not been conducted. What appeared then to be an exceptionally rich site was probably already fairly "standard" by today's metrics.

**In terms of habitat quality**, the expedition party was surprised by the extent and intensity of human impact in the study area. Most terrestrial habitats around Madang lagoon now harbour a dense human population, and even small islets in the lagoon are inhabited. Several of the originally existing inshore and estuarine mangrove habitats have been removed for the construction of houses, villages, and industrial complexes, including a tuna canning factory and harbour facilities. The ongoing development of a large industrial complex in the northern part of the lagoon ("Marine Park") is a hotly debated subject. The human settlements and industrial areas are lacking effective sewage treatment; most of the sewage is discharged into the lagoon or nearby sea.

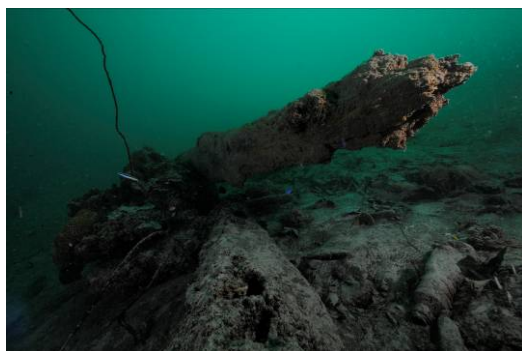
Extensive fishing is taking place in Madang lagoon. Some inshore sites are devoid of any small and cryptic species, while a few sites had the complete expected fish diversity. Fishing pressure is obviously less intense near the barrier. In the lagoon, we observed few fish specimens larger than 30 cm. Many of the large predators including most shark species are no longer found in the lagoon, but some are still present on the barrier reef. Despite these reservations, nearly all of the "endemic" species (described from Madang Lagoon and currently only known from here) have been observed during the expedition.

Overall, the shallow reefs (0-8 meters in the inner parts of Madang lagoon, 0-12 or 15 meters in the outer parts) were found to be healthy, typically with high living coral coverage, and appear unchanged compared to 20-25 years ago. However, the observed algal blooms of *Dictyota*, *Dictyopteris* and *Padina* may be a result of reef degradation.



Some of the spectacular seascapes that make Madang a world-renown diving destination

Sunken wood, which is now prevalent throughout the lagoon and nearby coastal areas, is a new phenomenon that did not exist 20 years ago. Garbage is prevalent almost everywhere.



Sunken wood



Garbage

By contrast, the deeper parts of the lagoon (in the depth range below 15-25 meters) have a severely depleted fauna (and flora) compared to our expectations based on similar surveys in the Philippines, Vanuatu and New Caledonia. As everyone in the Madang area knows, rivers after rain transport a massive amount of sediment (right) and organic matter that impact the ecosystems. This in turn may be a result of logging and more intensive agriculture activities. Forests provide a buffer to hold soil in place. In watersheds, where forests are degraded or destroyed, soil erosion increases during the wet season bringing large amount of sediment in rivers and eventually in the lagoon. Van Veen grabs taken during the expedition will allow us to develop indicators of the level of perturbation that the lagoon is experiencing.

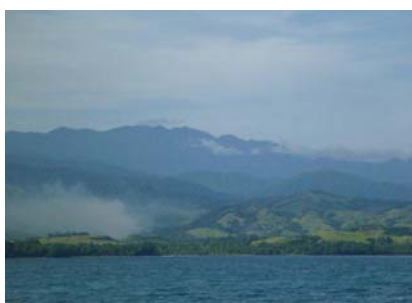


To go beyond impressions, sediment samples were taken to characterize the isotopic signature of the sediment: 9 freshwater rivers draining into the lagoon (total of 27 samples), 10 shallow stations inside the lagoon (30 samples) and 76 samples taken outside the lagoon. In addition, oysters were collected at 17 sites in the lagoon will be used to detect spatial scale pattern of influence by nitrogen from human and animal wastes within the lagoon.

**The deep-water part of the expedition** surveyed the deep-sea bottom fauna along the Bismarck Sea coast of the island of New Guinea, from Vitiaz Strait in the east to the border with Indonesia in the west. A total of 137 hauls (92 CP and 45 DW) were conducted. Special attention was given to Astrolabe Bay between 200 m and 1000 m.

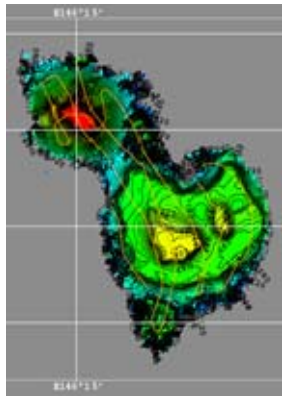
Detailed bathymetric data of PNG waters are scarce and, as a result of a very active tectonic regime, the bottom topography is very uneven. The success of the launching of the sampling gears relies on the bathymetric maps that are built with the Multibeam sonar of the RV *Alis*. The cruise largely took advantage of the results of the 2010 Biopapua cruise that had both identified the most interesting spots and provided preliminary bathymetric maps. Deep-sea environments seemed to be more or less homogeneous from Madang west to Vanimo.

The sampling of the hard bottom was particularly problematic, because the slopes of the Bismarck Sea coast of are either very steep and then the deep-sea floor is dominated by rolling stones that do not allow the installation of fixed organisms or the topography was more gentle and then we have accumulations of mud often associated with decaying plant remains.





Sampling the **seamounts** of Bismark Sea was not an easy task. As illustrated by the bathymetric map (below), most of the targeted deep-sea seamounts were more like needles than guyots. Sampling with a dredge was possible only over structures that were table-like. The few sampled organisms were however very interesting (like this unusual *Chrysogorgia* specimen).



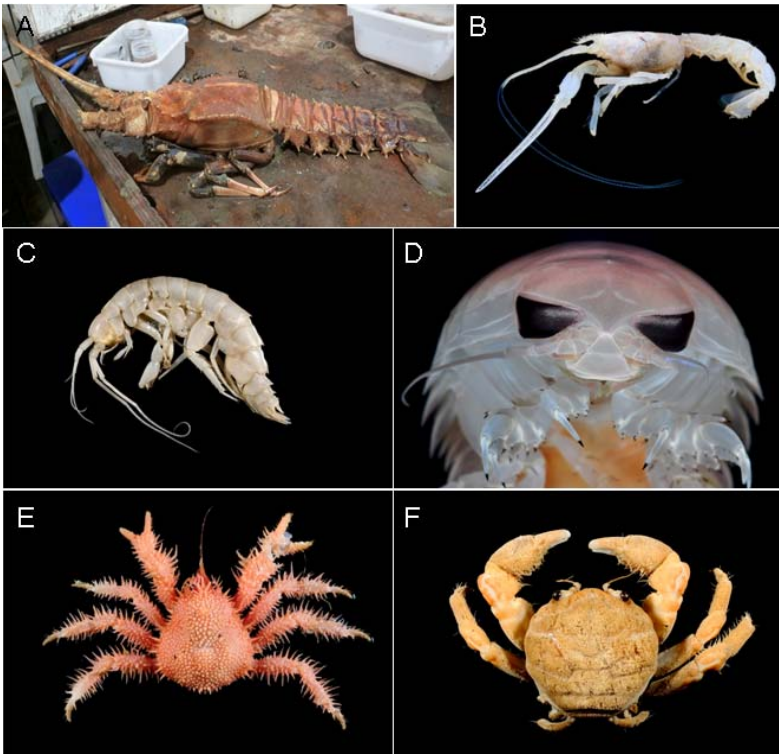
*Chrysogorgia*

Deep-sea **chemosynthetic habitats**: both fauna associated to decaying plant remains and cold seep environments were sampled. Plant materials are found both associated to soft and hard bottoms. Organisms associated to chemosynthetic bacteria were sampled (e.g. bathymodiolin mussels and siboglinids worms).



A cold seep environment identified off the Sepik River during the Biopapua cruise in 2010 was sampled again.

During the expedition, about 251 species of decapods have been sampled.



**A - Giant lobster :** *Linuparus* aff. *sordidus* (Palinuridae). This spectacular specimen (about 60 cm) collected at 300 m depth is a rare species. There is only 3 species for this genus and it is the first record of this species in PNG deep-waters.

**B- *Thaumastocheles* sp. nov.** (Nephropidae). Similar to 2 specimens collected from Biopapua cruise, a single specimen was collected off Madang.

**C- *Bathyceradocus* sp.** (Amphipoda, Maeridae). This species lives on chemosynthetic habitats such as sunken wood and are true wood-feeders.

**D- *Bathynomus* sp.** (Isopoda, Cirolanidae). Emblematic for the deep-sea, the giant isopod has been extensively collected during the expedition. First observations suggest it may be a new species.

**E- *Lithodes* sp.** This new species is under description.

**F- Dynomenidae.**

**Astrolabe Bay.** The Bay was sampled in the vicinity of the town of Madang, during day-trips; and off Basamuk below the outlet of the nickel mining tailings. The gentle topography allowed sampling over the whole bathymetric gradient covered by our sampling gears, down to 1000 m depth. In 2010, 9 operations had already been conducted in the Bay during Biopapua; 14 new hauls were conducted in 2012.

Near Madang, garbage was present in quantity as far as 2-3 hours of navigation away from Madang harbour, and as deep as 1,000 meters.

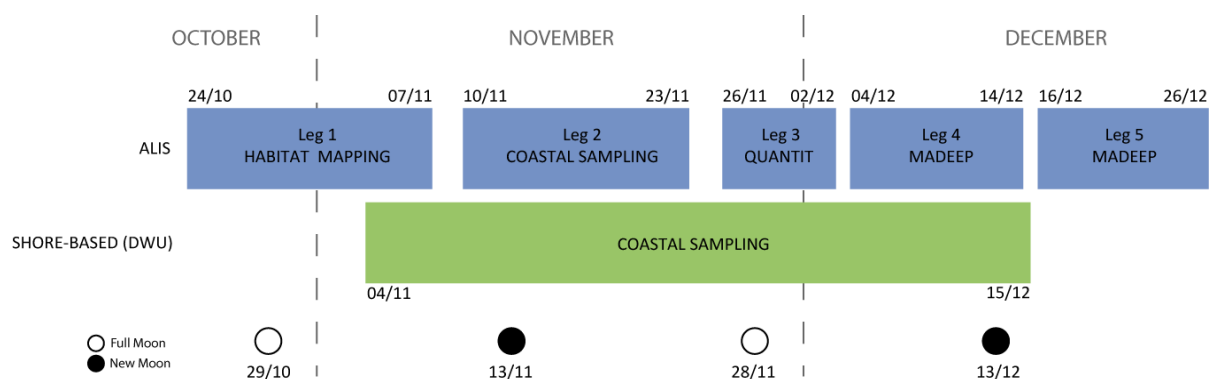


Off Basamuk, we sampled a diversified soft-bottom fauna and a chemosynthetic fauna typical of cold seeps environments (e.g. siboglinid worms and bathymodioline mussels) that already was showing the impact of mine tailings. Directly below the factory, the samples contained large amounts of red-colored mud that was not found anywhere else during the cruise. Although it is difficult to estimate the thickness of this mud, its incorporation into annelid worm tubes gives us clues (about 2 cm 50 m below the exit point of the mud and about 10 cm 200 m below the exit point).





## TIMETABLE OF ACTIVITIES AND MAIN EVENTS



### Main events

May 29-June 10, 2011	Informal launching of project concept and institutional contacts in POM and Madang
Nov. 28	Signature of MoU between UPNG, MNHN and IRD
Mar. 29, 2012	Submission of Marine proposal to DEC
Apr. 27	Madang Provincial permit
May 02	DEC approval
Jul. 20	Containers leave France (Le Havre harbour)
Aug. 17	DOFA approval
Sept. 22	Containers arrive in Madang
Nov. 5	Inauguration meeting with Governor Jim Kas and Madang District councillors
Nov. 24-25	Participation in Madang Festival
Nov. 30-Dec. 2	Visit of Prince Albert II of Monaco
Dec. 7	Meeting with councillors, clan leaders and resource owners in presence of Sir Michael Somare and Sir Arnold Amet
Mar. 15, 2013	Export permit approval from DEC
March 20	Containers leave Madang
Apr. 04	Containers arrive in France (Le Havre harbour)
May 06	Containers arrive at MNHN warehouse.

## Schedule of shore-based party

Nov. 3 and Nov. 4	Main arrivals of participants from abroad
Nov. 5	First day of work
Dec. 13	Last day of field sampling
Dec. 14	Breaking down the lab
Dec. 15	Main departures

## Schedule of *Alis*

Oct. 22	Arrivals from Nouméa
Oct. 23	Day off in Madang
Oct. 24 - Nov. 7	Leg 1. Habitat Mapping. PI Serge Andrefouet.
Nov. 8-9	Days off in Madang.
Nov. 10-23	Leg 2. Coastal sampling (diving). PI Claude Payri.
Nov. 24-25	Days off in Madang.
Nov. 26 – Dec. 2	Leg 3. Quantitative sampling (grabs) and deep-sea work (dredge, trawl) in Astrolabe Bay. PI Philippe Archambault.
Dec. 3	Day off in Madang.
Dec. 4-14	Leg 4. Deep-water dredging / trawling, Bismarck Sea. PI Sarah Samadi.
Dec. 15	Day off in Madang.
Dec. 16-26	Leg 5. Deep-water dredging / trawling, Bismarck Sea. PI Sarah Samadi.
Dec. 27	Day off in Madang.
Dec. 28	<i>Alis</i> sails to Nouméa.

LIST OF PARTICIPANTS

Research Party

Country	Title	Name	Affiliation	Shore / near shore survey			Offshore survey (MADEEP)
				Habitat mapping (Alis Leg 1)	Alis-based party (Alis Leg 2)	Shore-based party (DWU incl. Alis Leg 3)	Alis Legs 4-5
Australia	Dr	Julian CALEY	AIMS, Townsville			X	
	Dr	Julian FINN	Museum Victoria, Melbourne			X	
		Mélanie HAMEL	James Cook University / IRD	X		X	
		Hugh MORRISON	Perth Diving Academy			X	
	Dr	Gary POORE	Museum Victoria, Melbourne			X	
	Dr	Heroen VERBRUGGEN	Univ. of Melbourne		X		
Belgium	Dr	Frederick LELIAERT	Univ. of Ghent			X	
Canada	Dr	Philippe ARCHAMBAULT	University of Quebec			X	
	Dr	Cindy GRANT	University of Quebec			X	
Czech Republic	Dr	Zdenek DURIS	Univ. of Ostrava			X	
Germany	Dr	Bastian BRENZINGER	Zoologische Staatssammlung München			X	
	Dr	Ronald FRICKE	Museum für Naturkunde, Stuttgart	X			
	Dr	Timea NEUSSER	Zoologische Staatssammlung München			X	
	Dr	Peter STAHLSCHMIDT	Univ. of Koblenz-Landau			X	
France	Dr	Serge ANDREFOUET	IRD	X			
	Dr	Marie-Catherine BOISSELIER	CNRS				X
		Jean-Michel BORE	IRD	X			
	Dr	Philippe BOUCHET	MNHN			X	
		Bertrand BOURGEOIS	IRD	X			
		Barbara BUGE	MNHN			X	
		Laurent CHARLES	Bordeaux Museum			X	
	Dr	Laure CORBARI	MNHN			X	X
	Dr	Cécile DEBITUS	IRD			X	
		Cindy DUPOUX	MNHN			X	
	Dr	Baptiste FAURE	Biotope			X	
		Lee Ann GALINDO	MNHN			X	
	Dr	Jacques GRALL	Univ. Brest			X	
	Dr	Philippe GRELLIER	MNHN			X	
		Virginie HEROS	MNHN			X	
Dr	Stéphane HOURDEZ	CNRS				X	
	Pierre LABOUTE	Associate MNHN			X		
Dr	Line LE GALL	MNHN			X		

		Jean-Jacques LEMASSON	IRD			X	
	Dr	Pierre LOZOUET	MNHN			X	
		Philippe MAESTRATI	MNHN			X	
		Paula MARTIN-LEFEVRE	MNHN			X	
		Jean-Louis MENOUE	IRD		X		
	Dr	Eric PANTE	Univ. La Rochelle				X
	Dr	Claude PAYRI	IRD		X	X	
	Dr	Nicolas PUILLANDRE	MNHN			X	
	Dr	Sarah SAMADI	IRD				X
		Anouchka SATO	MNHN			X	
	Dr	Justine THUBAUT	MNHN			X	
	Dr	Rudo VON COSEL	MNHN			X	
Ireland	Dr	Matthew JEBB	National Botanic Gardens, Dublin			X	
	Dr	Marco OLIVERIO	University of Roma		X	X	
Italy	Dr	Francesca BENZONI	Univ. of Milano-Bicocca		X	X	
		Hiroaki FUKUMORI	University of Tokyo			X	
	Dr	Ryutaro GOTO	University of Tokyo			X	
	Dr	Takuma HAGA	JAMSTEC			X	
	Dr	Yasunori KANO	University of Tokyo			X	
		Tsuyoshi TAKANO	University of Tokyo			X	
	Dr	Daisuke UYENO	University of the Ryukyus			X	
Netherlands	Dr	Lisa BECKING	Naturalis, Leiden			X	
New Zealand	Dr	Bruce MARSHALL	Museum of New Zealand Te Papa Tongarewa			X	
	Dr	Ralph MANA	UPNG				X
		Andrew ASMANN	UPNG	X	X		
		Tyson SEBOMA	UPNG				X
		Rachel JAMES	volunteer			X	
	Dr	Jeff KINCH	National Fisheries College, Kavieng			X	
Philippines		Noel SAGUIL	Associate, Univ. of the Philippines			X	
	Dr	Alexander FEDOSOV	Russian Academy of Sciences			X	X
	Dr	Yuri KANTOR	Russian Academy of Sciences			X	
	Dr	Arthur ANKER	National University, Singapore			X	
	Dr	Heok Hui TAN	National University, Singapore			X	
	Dr	Inga MEYER-WACHSMUTH	Swedish National Museum of Natural History			X	
Sweden	Dr	Anders WAREN	Swedish National Museum of Natural History			X	
	Dr	Kwok Kan [Benny] CHAN	Academia Sinica, Taipei			X	
	Dr	Tin-Yam CHAN	National Taiwan Ocean University			X	
		Hsi-Nien CHEN	Academia Sinica, Taipei			X	
	Dr	Wei-Jen CHEN	National Taiwan University			X	
		Pi-Hsien KUO	National Museum of Marine Biology and Aquarium			X	

	Dr	Cia-Wei LIN	National Museum of Marine Biology and Aquarium			X	
		Pei Chen TSAI	Academia Sinica, Taipei			X	
USA		Stephanie ANDRINGA	NSU Oceanographic Center, Florida			X	
		Jessica GOODHEART	Calif. State Univ., Pomona College			X	
		Juliette GORSON	City University of New York			X	
	Dr	Terry GOSLINER	California Academy of Sciences			X	
	Dr	Mande HOLFORD	City University of New York			X	
		Vanessa KNUTSON	California Academy of Sciences			X	
		François MICHONNEAU	Univ. of Florida			X	
	Dr	Greg ROUSE	Scripps Institution of Oceanography, La Jolla			X	
		John SLAPCINSKY	Univ. of Florida			X	
	Dr	Ellen STRONG	Smithsonian Institution			X	
		Mindi SUMMERS	Scripps Institution of Oceanography, La Jolla			X	
	Dr	James THOMAS	Nova Southeastern University Oceanographic Center, Florida			X	
	Dr	Matthieu LERAY	Smithsonian Institution			X	

## Observers, Trainees, Media and Support Staff all shore-based party (DWU)

Country	Title	Name	Affiliation
Australia		Mali MOIR	Artist, Melbourne
France		Laurent ALBENGA	diving logistics, MNHN
		Jean-François BARAZER	boats logistics, MNHN
	Dr	Anthony BERBERIAN	Medical Doctor
		Anne-Laure BOUCHET	volunteer
		Xavier DESMIER	press photographer
		Sébastien FANINOZ	MNHN
		Eric FOLCHER	diving logistics, IRD
		Michel LE GALL	volunteer MNHN
		Thierry MAGNIEZ	MNHN / schools program
		Sarah PEZET	MNHN
		Pierre SAMUEL	volunteer MNHN
		Regis CROIZER	journalist
		Gwenlaouen LE GOUIL	journalist
Germany	Dr	Tanja BOGUSZ	sociologist, Humboldt Univ., Berlin
Japan		Mitsuo CHINO	Malacological Society of Japan
New Caledonia		Jacqueline SIRIEIX	schools programme
		Carole BERNARD	schools programme
		Christine PACUTA	schools programme
		Brenda GOROWIRIDJA	schools programme
		Ferdinand KIOLET	schools programme
		Laetitia KOTEREU	schools programme
		Désirée POGNON	schools programme
		Joanna MARA	Student, University of New Caledonia (UNC)
		Audrey ESPALIEU	Student, UNC
		Elaine AQUILA	Student, DWU
Papua New Guinea		Thelma HUNGITO	Student, DWU
		Maclay LAMANG	Student, DWU
		Reuben TABEL	Student, DWU
		Rachael ATUA	Student, DWU
		Thomas WARR	Student, DWU
		Cornelia KALIMET	Student, UPNG
		Graham KAINA	Student, UPNG
		Clementine SESEGA	Student, UPNG
		Dave ANAN	Student, UPNG
		Ken GANZIK	Student, UPNG
		Grace NUGI	Student, UPNG
		Selma PAMOLAK	Fisheries Officer, Exxon Mobil Highlands
		Richard IBIK	Diver, Riwo Village
		Jasmine DUADAK	WCS New Ireland
	Dr	Nicolas GARNIER	UPNG
		Terah SIARE	Student, UPNG
		Christine SIWISIKA	Coastal Fisheries Agency
		Delson OPOS	Coastal Fisheries Agency
		John OMAR	Local support staff
		Rodney KAMITHZ AZUMA SELARN	Local support staff
Philippines		Jo ARBASTO	professional fisherman
Venezuela		Marcel VELASQUEZ	Master Student