

11. Pelagra

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Pelagra is a neutrally buoyant sediment trap designed and manufactured at the NOCS which, it is hoped, will collect samples of settling marine snow representative of those falling from the upper ocean without the bias associated with conventional upper ocean traps caused by turbulence, shear and swimmers. The general principle of operation is that the float should become neutrally buoyant at some depth and then spend its deployment period drifting around the upper ocean subject to internal wave and current activity collecting material. It consists of an Argo float with modified software around which are clamped four steep fibreglass collecting funnels and 6 semicircular buoyancy hoops. Beneath the float sits a timer activated release which drops a weight to enable surfacing and trap closure, this weight activates at 450m in case of severe overballasting. Above the float sits a titanium lifting frame. At some predetermined time a timer activated dropweight falls off which results in the traps shutting and the float surfacing. At this point it begins to signal its position to the SOC via the Argo network, these signals can be detected on board using a Gonio receiver which allows the range and bearing from the ship to be determined. The vehicle is visually located via large orange flags strapped to the lifting framework. Its deployment is complex, requiring the setting up of a separate pressure logger, the float itself, an associated CTD cast for ballasting, the timer release system and the preparation of preservative solutions. Its usage on this cruise represents the first time that multiple long deployments have been possible on a single cruise and also the first time that a surface pressure activated dropweight has been used. Six deployments were undertaken, detailed below in Table 11.1.

Table 11.1 Pelagra deployments on D285

Deployment	Site	Station	Date in Nov	Target depth (m)	Latitude	Longitude	Duration (hours)
1	M3	15495,6	13	200	46 04.8	51 44.61	78
2	M2	15501	19	100	47 46.4	52 49.7	7
3	M6	15508	21	100	48 59.9	51 28.558	9
4	M3	15515	24	150	46 07.3	51 49.72	8
5	M8W	15522	26	200	45 00.2	49 31.18	41
6	M8E	15535	30	200	44 53.2	49 40.9	41

Deployment 1 was conducted at M3 using our then best understanding of how its buoyancy responded to pressure and temperature. It resulted in a substantial overshoot however the float became stable at depth immediately prior to the emergency pressure release firing. This period of stability allowed us to recalculate the ballast required to reach a particular depth on subsequent deployments. Deployments 2, 3 and 4 were short and conducted at M2, M6 and M3 with shallow target depths. They resulted in modest catches of material. Deployments 5 and 6 were conducted for longer (41hr) and deeper (250m) at M8E and M8W and resulted in substantial catches of material. A crude chlorophyll based estimate of export efficiency (export/production) at 250m at M8W is about 10%, consistent with other observations.