

Table S1: Summary of underway data acquisition

Instruments	Parameters and sampling rate	Coverage
Pandora Thermosalinograph, Sea-Bird	SST ^a , SSS ^b , 6s	Whole cruise
ADCP OS38, RDI	U, V, 5 and 10 mn	Whole cruise, ~ 40 – 1200m depth
ADCP OS150, RDI	U, V, 2 and 10 mn	Whole cruise, ~ 16 – 260m depth
BATOS meteo station	Dry and wet T, Press., RH, 1s.	Whole cruise
Gill anemometers, 2	Wind vel and dir, 1 s	Whole cruise
EK60 12 kHz sounder	Water depth, continuous	Full cruise
High flow rate seawater pump	Ra isotopes	
Pumping system for atmospheric aerosols	Particulate P, Ca, Al, Fe, Mn, Zn, Co, Cu, Ni, Cd, Pb, ²³² Th, Ti, Sr, Pb, REE, 4 samples.	Western Solomon Sea
Sampling system for clean rain water	Total P, Ca, Al, Mn, Zn, Co, Cu, Ni, Cd, Fe, ²³² Th, Ti, Sr, Pb, REE, 6 samples.	Solomon Sea
Sampling system for pH in rainwater	pH, 30 samples	Whole cruise
MoorSPICE		
Thermosalinograph, SBE-21	SST, SSS, 2s	Whole cruise
ADCP OS75BB, RDI	U, V, 5 mn	Whole cruise, ~ 40 – 985m depth
ADCP OS75NB, RDI	U, V, 5 mn	Whole cruise, ~ 40 – 985m depth
IMET Sensors	Dry and wet T, Press, RH, 2s	Whole cruise
Gill anemometers, 2	Wind vel and dir, 2 s.	Whole cruise
EM302 Sounder 30 kHz	Water depth, continuous	Whole cruise
MR14-02		
Thermosalinograph, Sea-Bird	SST, SSS, 60s	Whole cruise
ADCP OS75, RDI	U, V, 5 mn	Whole cruise, ~ 25 – 649m depth
HMP155, Vaisala and 43408 Gill	Dry and wet T, RH, 10 mn	Whole cruise
05106, R.M. Young	Wind vel and dir, 10 mn	Whole cruise
PSP Eppley	LW and SW radiation, 10 mn	Whole cruise
SEABEAM 3012, 12 kHz	Water depth, continuous	Whole cruise

^a Sea Surface Temperature

^b Sea Surface Salinity