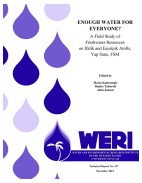

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# IFALIK ATOLL

## Fieldwork Log

August 10-25, 2015

**Field team members:**
MK - Maria Kottermair, hydrologist/GIS analyst (field team leader)
DT - Danko Taboroši, geologist/hydrologist (assistant team leader)
VB - Vivianna Bendixson, groundwater specialist
BW - William (Bill) Whitman, hydrologist
BM - Blaz Miklavic, geologist
AJ - Andrea Jalandoni, anthropologist
MF - Mandy Flowers, ecologist and outer island field specialist

**Monday - August 10, 2015**

Team meeting at House 5 with Dr. Jenson. Final pre-departure briefing, discussion of safety issues. All team members were recommended to read the WERI technical report for the Fais study. We agreed to pre-brief each morning and debrief each night. We finalized our safety policy on land and at sea (including mandatory checking of boat safety equipment before boarding in Yap).

**Wednesday - August 12, 2015**

Arrived very early from Guam to Yap (0100 arrival). Rented a van, rested a few hours at the Palauan Abai (MK and MF secured drinking water from the Manta Ray Hotel), showered and headed out to get supplies for the trip and check on the chartered boat. As we arrived at the dock the boat pulled in; it had been out lugging a free-floating barge that was found in the ocean near Yap. The government had asked the captain to bring it in because he was the most experienced person who could pull the large structure without damaging the reef. MK and DT spoke with the captain and toured the boat, and then VB came aboard to review safety features and protocols with the captain. It was agreed that the boat would be cleaned and ready by 1600.

VB, BW, and AJ were dropped at the hardware store YCA to buy supplies. We settled on materials and while AJ paid for purchases, BW and VB walked to the other hardware store to search for a few more items. Walked back and MK and BM were just arriving at YCA. BM decided what we had purchased for the tidal gauge was not sufficient so we exchanged a few items and purchased some rebar. Margie Falanruw came by and picked up AJ to go grocery shopping. DT joined them to pay for the purchases of food supplies for us and food and similar gifts to the atoll leaders and community members. BM secured a person to cut the rebar to the needed length and sharpen the end. VB and BW waited at YCA and out of the heavy downpour.

MK and DT picked up VB, BW, and BM and headed to Yap State Department of Resources and Development (R&D) to meet and greet. AJ and Margie Falanruw joined later. MF was running errands still and then got caught in heavy rain and could not join the meeting. Departed at sunset and shortly afterwards had a safety briefing with the team. Assigned partners and each person took a watch shift throughout the night.

**Thursday – August 13, 2015**

Arrived to Sorol atoll.

BM performs reconnaissance walk along the shores of Bigelimol Island ("Crab Island") in search for sea-level indictors that could be used as comparison of the sea-level change trend on different Micronesian islands.

The rest of the team walks around the island for several hours.

Everyone swims back to the ship together.

**Friday - August 14, 2015**

Aboard the ship, discussion led by DT and MK about schedule once on island. The plan was to install one pressure logger as a tidal gauge in the lagoon, one pressure logger for atmospheric pressure, four pressure loggers in selected wells (three in a transect cutting across the island and a fourth to be determined preferably not in use), and two conductivity loggers (one in a coastal well the other in a deep well or one with a noticeable conductivity gradient). Loggers would be set at 15 min sampling events starting on the hour and all synced to the laptop time. The conductivity loggers (both in-situ and field) would need to be checked against standards. A preliminary plan to hang the loggers was set based on the previous study but could change based on the wells. The expectation was to spend one hour with the chiefs, start working, and finish installation of all loggers on Day 1. MK argued that this timeline was unreasonable due to having little to no data about the current status of the wells from the previous study completed in the early 1950s. If the wells were still open, in working condition, and available for the study then the time-line might work. Otherwise there would be significant time spent on searching the island for acceptable wells, with usable dimensions, in a transect across the island that could be made available during the study. The parameters to collect for the wells sometime during the week are as follows: GPS points, measurements at surface (widths at opening), photos, depth to water from a selected measuring point, conductivity and specific conductance profile at the top of the water column and at the bottom of the water column, depth of well, water quality including pH, nitrate, and *E. coli*. Additionally the chiefs and villagers might have activities planned for us that we would be expected to attend once we arrived on island. We agreed the well team would work until midnight if needed to complete the tasks on Day 1 because they would be needed for other tasks every day.

**Saturday - August 15, 2015**

Arrival in Ifalik around 0330. Around 0700 field team leaders MK and DT went onshore to the main men's house to present gift (rice, coffee, betelnut, lime, and iREi books "Student Atlas of the Federated States of Micronesia") to the three chiefs and ask permission for the rest of the team to come on land. The rest of the team joined in about 45 min later and all cargo was offloaded by 0800. Chief Manu, the most communicative among the chiefs, asked that we delay the start of our activities because Saturday was a Catholic holiday (Assumption of Mary) and the following day was Sunday, neither of which could be worked on. Explaining the urgency of deploying the loggers as soon as possible, we asked for permission to take advantage of Saturday to at least take a look at the wells from the 1950s study, and to work normally on Sunday. The permission was granted.

0900 MK and AJ check in with Bruce Best on the radio and listened to weather report while the rest of the team joined the community at mass. Community meeting afterwards also in front of the church, field team leaders MK and DT were asked to sit with chiefs and give a speech to the assembled people. The speech / introduction of our research purpose was followed by lunch (preserved breadfruit, pounded breadfruit, taro, banana) for the whole community.

1300 Setting up camp in main men's house

1415 Group splits up:
BM/DT → seize spring low tide for reconnaissance search of microatolls at the northern tip of the island, extremely low tide, air smelly from exposed and dying coral, DT took many unusual photographs of the massive bleaching event across the barrier reef; after that BM/DT returned to camp to check for location to install tide gauge and search for old benchmark reported by previous researchers; all done with guides Melvin and Jimmy
VB/BW → looking for wells from 1950s study; visited approximately 13 wells (incl. 1 pond, 2 unused, the rest of wells currently in use) but old wells used in the previous study seemed all to have been filled in and either abandoned or filled with dirt to grow taro; accompanied by MK for most of the reconnaissance.

1700 By this time, VB/BW had a handful of potential level logger observation wells were identified. These wells were in a transect that went from the lagoon side of the island's shore to more than halfway inland to the center of the island, not too far from the men's house where we were staying. They measured depth to water, total depth, and the estimated well dimensions of all the wells. MK took GPS location and pictures; with guides John and Peter
AJ/MF → setting up camp (including solar power system); cooking dinner

1900 BM/BW began prepping the PVC for installation during the next light

1930 Dinner with Chief Manu and some of our guides at the men's house where we are staying

2045 Raining hard for a bit
Going to sleep early

**<u>Sunday - August 16, 2015</u>**

More rain during the night → we collected about 1 inch in our bucket

0600 Woken up by church bells

0700 Breakfast; several guides joined us for coffee (the most desired product we brought)

0830 Meeting with entire team and getting ready for today's work (we had to wait for our guides to come until church mass was over);
DT spoke with school teachers, and reported that Dominic (school teacher) said that people want to learn more about our research;
VB and BW setting up loggers → discovered that the loggers had not been tested in Guam and the HOBO software available on the laptop is not compatible with these loggers (originally MK planned to bring her laptop but changed plans last minute). We debated if DT/MF should go to Woleai where they have internet to download new version so loggers can be programmed.
Tested conductivity loggers with standards, programmed both conductivity loggers and both non-vented pressure loggers (one for tidal gauge and one for atmospheric pressure)

0900 DT/MF → exploring the island all day to look for good vegetation plots for surveys, they set up 5 vegetation survey sites (Liugiul Giliyawe, Feraayati, Faliugiumei, Faali Feliuwe, Gepaligolo), with guides with guides Dominic Tachielig and Peter Tewasilpiy
→ This took all day, finished at 1830

1000 VB/BW activated the 2 steel loggers with a 1000 start time. The 2 conductivity loggers (named Ifalik_cond_1 & Ifalik_cond_2) activated and ready for installation.
DT/MK visit captain Callistus in his village to see possibility of going to Woleai but found that the ocean is too rough at moment (waiting for next day if weather gets better per captain's suggestion)
BM, in failure of a clear identification of the exact location of the previously established benchmark, established a new benchmark in front of the island's main Man's House
BM made an attempt to measure the elevation of the selected wells relative to the newly established benchmark was made. Due to technical problems with the laser differential level instrument the elevation of only the closest well could be measured.

1200 BM/AJ/MK → started elevation survey (→ problems with survey equipment) then @1400 (low tide) BM/BW install tidal gauge on reef in front of main men's house → tidal gauge installed @1536

1600 BM/AJK → kept working on Margie's laser meter but without success even though meter was charged;

1530 VB/BW → installed and deployed conductivity loggers in well "q" and "t" and atmospheric pressure logger at the back of the men's house. Also started at 1700 hourly measurements of depth to water from selected measuring points, conductivity and specific conductance readings at the top and bottom of the water column. VB recorded exact times and level and conductivity readings in the field notes. Guides, John Yarofalpal, Ramon Tailugugar, and Mark Pekalmul, all of the Geofaluwe Clan assisted with the installation. VB accompanied Bill for the remaining hourly measurements at wells "q" & "t" for the rest of the day, and recorded the readings collected. Measurements were collected at 1800, 1900, 2000, 2100, and 2200. John and/or Ramon and/or Mark accompanied each trip to the wells depending on who was around and available for escort. Curfew kicked in at 2200 so no measurements were collected after then.

1630 BW/BM installed the tidal gauge in the ocean

1700 Discussion by MK and VB about conductivity logger placement while BW measures conductivity of well "t" and "q". After this measurement it was suggested that one person is not capable of taking all required measurements so a 2-person team would be necessary to collect water level, water temperature and conductivity readings at the top of the water column and at the bottom of the water column.

Dinner: leftover lunch and ramen with hard boiled eggs

1900 MF worked with a group of local guides to create maps of households, sorts out structures we digitized in GIS from remotely sensed imagery, notes down names, identifies types of key structures, and works out household village affiliations and boundaries. This is essential for the household survey to begin the next day. → Worked on this until 2130, completed Rawaiu area

2030 Debriefing:

- VB/BW will measure these two wells every hour from 0700 until 2200 (curfew → we could never quite figure out if the chief said the curfew applies to us too or not but nevertheless it would be unreasonable for two people to continue the measurements throughout the night and not getting any sleep plus potentially disturbing the community especially with dogs barking as we traverse to the wells near the houses); the next day they will add well "p" (which is closer to the middle of the island);
- DT suggested that pressure loggers are moved around different wells after 24 hour periods to cover for the 2 loggers that could not be deployed due to software issue. DT suggested to call Dr. Jenson to see if he prefers leaving the loggers in one well or moving them around (since we have fewer working loggers than we anticipated); called Dr. Jenson on satellite phone at 2100 for few minutes → he said it is up to us to decide but suggested if logistically doable to move loggers around;

- VB/BW will take atmospheric pressure logger out tomorrow (after 26 hrs) and move to well close to lagoon, leave in for 26 hours (24 hrs plus few hours to allow for tidal lag time), then move to well more inland (first "p" then "q"); reg. conductivity logger, will depend on tomorrow's reading → if no difference between "p" and "q" then possible leave in "q"; originally, "q" was chosen because it was further from the lagoon and had most water but on second consideration "p" might be better since it is more in the middle ("p" is actually closer to the ocean and might be more influenced by the ocean tide;
- Note: according to 1950s study, the tide in the lagoon lags about 2 hrs behind the ocean tide); possible other location for conductivity measurements is well "d" as water column was highest (~2.5 ft) during initial survey

**Monday - August 17, 2015**

0700 VB/BW continued hourly well (transect) survey: "t" and "q" plus added "p" today
→ observed an anomaly in "q" - reversed water column (conductivity consistently higher on top than at bottom just slightly but consistently) → first measurement was at 0700, continued doing this until 2200, so that measurements at all 3 wells occurred during the hours of 0700, 0800, 0900, 1000, 1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000, 2100, and 2200. For much of this period VB/BW were escorted by guides John, Ramon, and/or Mark.
In between measurements the following significant events were recorded:

- After the 0900 measurements, Bill stopped at the school and got the weather report from Bruce Best. Bruce discussed the 2 storms passing north of the Marianas and gave us a forecast for the area around Ifalik. Bill was also able to chat with Bruce briefly to let him know that all is well and we were hard at work. It was not that much of an exaggeration.
- It rained from around 1030 to 1120.
- Took lunch break from 1230 to 1300.
- Read the rain measurement "pot" to be at 3/8 of an inch.
- The atmospheric level logger was installed into well "t" after the last measurement (at 2200), and Bill pulled about 40 gallons from well "t" from 2205 – 2215 to fill up our shower water supply (55 gallon drum).

0830 Started household surveys: Well & Rainwater Catchment System (RWCS) Inventory
AJ/BM → RWCS (dimensions of roofs (potential and effective catchment area, description, usage, etc.)
DT → Wells (description, measurements, usage, well photos, etc.) plus geotagged photos, also conducted brief interviews regarding usage of different types of water; at one household, was told that somebody put a dead cat inside a rain catchment tank to harm the family.
MF → Compound IDs (# structures, people), photo documentation, sketches compounds and makes maps of all structures, classifies them by type. We discovered a detention house in one place (and found it in two more places later in the survey), where families keep members with psychological problems under full solitary confinement, sometimes for many years, feeding them through gaps in the prison-like wall.
MK → GPS location and photo of wells and all storage tanks
→ Survey continues until 1700; accompanied by guides Mark Pekalmul, Callistus Hasefalgar, and Peter Tewasilpiy

1700 Heavy rain → hide in a cooking hut where a woman made delicious fresh breadfruit chips

1730 Dinner at camp
VB/BW → continue hourly conductivity/water level measurements at wells "t", "p", "q"

1900 MF continued work from last night, with a group of local guides to create maps of households
→ Worked on this until 2200, completed Felaashig area

2030 Meeting MK/BM about how to make RWCS easier (Note: because of the many measurements the RWCS survey the rest of the team usually has to wait to continue to the next household together); suggestion is to have a designated guide be actively involved in the measuring process while AJ takes notes; important to have snack breaks as some team members get low on energy without frequent snacks;
Regarding Elevation survey: Margie's laser meter still not working despite battery charged
→ seems that laser itself is not working; problem with other laser meter and tripod method is the error (~4cm over 30m span); if everything else fails, we should at least get measure elevation from tide gauge to first well if possible;

2130 Meeting MK/VB to discuss plan for next day: 1. add additional well for hourly conductivity measurements further north to see if there is a difference in conductivity (maybe "d" or "e"); 2. If difference can be detected, move logger from "q" (since it's well with anomaly) to either well "d" or "e" (whichever is the deeper one), otherwise more "q" to "p" (which they observed slight gradient); continue with hourly measurements tomorrow;

2200 VB/BW take last measurements and move pressure logger from atmospheric readings to well "t" and will leave for a 26 hour period. Water level measurements will only be taken at installation and removal.

Note about family preparing food for us (behind men's house): we came across them while surveying and asked them if we could trade the Spam we gave them earlier to cook for us for local food (we saw them prepare wraps with breadfruit mash) since the whole team would rather eat local food; later the chief asked us if we could trade coffee instead of Spam for local food; we had to deny but explained to the chief that we are really running low on coffee; felt bad about it; lesson learned to bring more coffee next time; however, after this, the word must have spread that we don't have bottomless coffee supplies as the number of people requesting coffee from us in the morning ceased.

**Tuesday - August 18, 2015**

0700 VB/BW continued hourly measurements of water level and conductivity on the surface and bottom of the water column at wells "p" and "q". Measurements were collected at 0700, 0800, 0900, 1000, and 1100. After the measurement at 0800, VB/BW went to look at another well, Well "e", off-gradient-to the north of our current transect. They also collected water level readings and conductivity on the surface and bottom of the water column at well "e". Measurements at well "e" continued and occurred at 0830, 0950, and 1045, before it was decided that the readings may not be so indicative of what is going on at the other wells in our transect. John escorted them for most of the morning. The actual measurements were recorded in the field notebook by VB. Well "e" had been added just long enough to see if the conductivity gradient is greater to include in the study. By 1100 the decision was made to not include in the study. The current wells are sufficient; also well "e" is too far. After the round of measurements at wells "p" and "q" at 1100, the conductivity logger at well "q" was moved to well "p" at 1154. No further hourly measurements were collected at well "q" thereafter. Since conductivity was already being logged, only water level measurements were collected at well "p" for the remainder of the day. Water level measurements were collected at 1215, 1315 (4.32 ft. from TOC), 1415 (4.48 ft from TOC), 1620 (4.75 ft. from TOC), 1715 (4.82 ft. from TOC), 1825 (4.78 ft. from TOC), 1922 (4.65 ft. from TOC), and 2023 (4.49 ft. from TOC).

0830 RWCS/Well team departs and continues with Rawaiu village
→ AJ/BM/DT/MK/MF continue tasks from the previous day of survey
→ Note: MK changed time on Juno (GPS unit) two hours forward to local time (MK not sure why it was wrong in the first place)
→ Survey lasted all day, we covered the rest of Rawaiu and almost all of Felaashigi

0915 BW sat in for 30 minutes on the weather report from Bruce Best, and again passed along a message of our activities.

1030 Finished with Rawaiu and started with Falachik

1100 Both teams run into each other near well "o" while taking the last reading at well "e"

1200 Coconut break at ECE then lunch at camp

1530 BW/VB attempted to begin collecting grab samples from the monitored wells, but rain started so sampling was postponed.
1400 Continued with Falachik
Rain starts again → took cover in hut (F16) where girls were weaving lavalavas
(stayed for about half hour to wait for rain to stop before continuing)
Surveyed up to F9, only start with F8
1600 BW performed a bump test on the YSI Conductivity and Salinity meter to confirm that it is still collecting relatively accurate and consistent readings.
1730 Break in front of hut with beautiful grass with our guides and older local woman
Dinner leftover lunch and ramen (we had few local snacks today incl.
breadfruit seeds /taste like chestnuts/, fresh ground coconut, etc.)
Meeting MK/DT about plan for remaining days:

- suggestion for tomorrow morning for DT/MF just to do wells and verify household name and provide ID plus leave note w/ well ID at each well for MK to take GPS location
- after RWCS team finishes two northern villages, change method and ONLY survey roofs with gutter and storage tanks instead of all potential roof areas to save time and be able to finish survey in time;
- VB/BW did water quality testing (10 wells, 10 tanks), started with three wells they have been monitoring and community water storage tanks, chose the other locations by number of people using it and distributed over the villages and wells by usage (if used for cooking);

1830 DT went to see the captain to inquire about weather and departure schedule (if we can extend the plan for a day), but the captain was not there
1900 MF continued work from the previous night, with a group of local guides to create maps of households → Worked on this until 2200, completed all households on the island

**<u>Wednesday - August 19, 2015</u>**

The morning rains were very heavy and were accompanied by strong winds.

0730 DT/MK depart to continue well survey in Felaashigi → took all day, finished around 1830
0746 The rain measurement "pot" which was set back out around 0500 (according to MK) measured about 3/16 of an in – in the last 2 hours.
0815 Continued household survey in Felashiigi (at F8) and started water sampling (conductivity, pH, specific conductance, temperature, Nitrate, *E. coli*); DT/MF had gone earlier to be ahead of rest of household survey team but leaving notes; however, when RWCS team got to F8 other team just arrived too since they had to pick up their guide first, hence, we ended up doing our survey as a group again;

0815 VB/BW escorted by John begin today's work to collect 20 samples for nitrate, pH, and *E. coli*. 10 of the 20 samples to be collected from wells and 10 samples from water catchments. In addition, chloride grab samples to be collected from wells "t" and "p".
0828 VB/BW sampled well "t" also removed pressure logger to install in well "p"
0908 VB/BW sampled well "p" and installed pressure logger
0933 VB/BW sampled well "q"
0956 VB/BW attempted to sample the school catchment but the water level was too low to reach the faucet. The tank was recently cleaned and had not filled up enough to be able to collect a sample.
1003 VB/BW sampled at the dispensary

1020 VB/BW attempted to sample south ECE but faucet is located inside the building and the building is locked. Stopped at canoe house on way to north ECE and meet with MK and DT.

1015 Back at camp – tea break (VB/BW are back too) – sampled 3 wells + dispensary so far (ECE locked, school tank still empty) → discussion which wells/ tanks to sample next → chose wells with many users and where water is used for cooking

- R7 2 wells, both different condition, one murky/one not → good to sample both
- R4 has 4 wells but only one for cooking (R4-1)
- F11 has 2 wells for cooking but only sample the one without a net (F11-1)

1123 VB/BW sampled at south ECE, disconnected pipe at outside connection to collect sample.

1152 VB/BW sampled at north ECE from faucet inside kitchen.

1206 VB/BW sampled at F16, rain catchment from faucet outside tank.

1230 VB/BW sampled at F10, rain catchment, 2 available sampled from one nearest the main path

1256 VB/BW sampled at F11, round well

1312 VB/BW sampled at F11, square well

1336 VB/BW sampled at R10, rain catchment

1348 VB/BW sampled at R4, round well

1400 VB/BW headed back to canoe house for lunch and more *E. coli* sampling bottles. Lunch back at camp

1500 Continue household survey; entire team goes together, VB/BW join so that they can be shown which wells to sample, then they continue on their own;

1554 VB/BW sampled at I10, well. Decided to break from group otherwise sampling would not be completed in one day. Discussed the sampling list and left the group.

1620 VB/BW sampled at I14-2, rain catchment

1640 VB/BW sampled at I12, rain catchment

1655 VB/BW sampled at Y4, rain catchment

1705 VB/BW sampled at Y3, well

1715 AJ did not feel well, headed back to camp (BM left soon after since he could not continue by himself), AJ and BM rest, MF/DT/MK continue with household IDs and well survey and GPS; Note: Iyefang community tank here is also not in use anymore → cracks said to be due to bad building material (lots of sand), built in the 1980s, hasn't been used for the last 5 yrs or so

1733 VB/BW sampled at R6, rain catchment, sampled tank at NE end

1749 VB/BW sampled at R7, round well

1759 VB/BW sampled at R7, square well

1815 Finished last village with wells (was rather challenging as organization of households/ compounds in both southern villages was quite complex and not as easy to recognize as northern villages which lead to frustration of tired team members; in addition, many households didn't have their own catchment but put their tank at their relatives house);

1900 BW pulled about 40-45 gallons of water from well “t” to refill the shower supply.

Note: DT supposed to meet captain last night to talk about departure plans but he was out fishing; since an extra day would be helpful and give us some more time to finish our surveys, we wanted to see if pushing out departure back one day to Saturday was possible; DT/MK talked to him today and he said Saturday was fine and we can still make it back to Yap in time and even stop in Eauripik and Sorol!

Each team member was given some *E. coli* sampling bottles to incubate. DT/MF protested against this practice but accepted after pressure from VB/AJ/MK. Everyone went to sleep with bags of *E. coli* sample bags attached to bodies with sticky tape.

**Thursday - August 20, 2015**

0400 MF awoke when the *E. coli* sample bag on her body leaked and she accidentally ingested some of the *E. coli* medium. VB pulled all the bottles from team members and checked for presumptive positives. 13 of 20 were presumptive positives.
0500 Heavy rain, feels stormy (pot outside filled up) until later in the morning when it calmed down
0800 DT conducted household interviews in Rawaiu and Felaashigi all day with Callistus Hasefalgar, completed interviews at Fareigi, Welippiyi, Faali Feliuwe, Gatiye Raali, Liuteitei, and Faliugiumei. → completed around 1200
0900 BW sat in on the weather report from Bruce via radio: High Surf Advisory, SW wind 20 kt (9ft surf offshore), cloudy and rainy; by tomorrow afternoon will drop to 7ft, maybe down to 6ft by Monday; Supertyphoon with 150 mi/hr over Northern Marianas but nothing behind it, leaving Saturday would be good, still bumpy but not as bad; tells us to check in with him at 0830 tomorrow morning; Bruce was not in today, however the female substitute requested that MK speak with Bruce around 0930 and Dr. Jenson around 1030. MK was also there to receive the message.

AJ does not feel well (feverish) and rests the whole day.

1000 BM/MK re-attempted elevation measurement of the wells by assembling an alternative differential leveling setup. Elevation survey accuracy check from benchmark to school and back (result: 4cm).
1200 DT conducted interview with Peter Malmai, health assistant, working at the dispensary → completed at 1330
1300 VB/BW Set up logger installation at well “q”
1312 VB/BW Measurements at well “p” and removed logger
1318 VB/BW Measurements at well “q” and installed logger. VB/BW also collected a set of data parameters (water level, and conductivity at the bottom and top of the water column within the wells). VB recorded the results in her field notes.
1330 DT/MF start vegetation survey, complete work at sites Feraayati, Faliugiumei, Faali Feliuwe → work finished at 1815
1400 BM/MK finish RWCS survey in Iyeur where left off yesterday, VB/BW joined them (MK recorded GPS location plus took over AJ's part with taking notes; BW helped with measuring) → continued after 1700; escorted by guides Mark and Callistus.

Dinner at Peter Malmai's (health assistant at the dispensary) house for all girls (MK joins later, still out in the field with DT)

1915 Community leaders assemble for the meeting (15 local people present and DT/BW/BM)
1935 MK/AJ/WB/MK arrive late, meeting begins
→ DT leads the meeting, explains some key concepts about the lens and we mentioned some preliminary results; we discussed several issues but their main need seems to be new and better community tanks to bring them through the annual dry season where they always seem to run low on water, DT conducts interview with leaders → meeting finished at 2130

**Friday - August 21, 2015**

0730 VB/MK verified *E. coli* samples as being all positives with only one questionable negative at the North ECE. This sample did change colors but did not fluoresce like the other samples. Bacteria was present but is most likely not *E. coli*.

0815 DT/MF continued vegetation survey, completed sites Liugiul Giliyawe, Faali Giliyawe, and Nimmweoiu → work finished around 1800; DT and Dominic Tachielig separate following quadrate setups to conduct household interviews (while MK remains with Peter Tewasilpiy to work on species identifications and relative abundance)

0815 During breaks in the previous work, DT with Dominic Tachielig conducts household interviews in Weluuwari, Ilesoariuwe, Niwegitobu, Gaawongi, Paliyaaiuriu, and Faali Cheli → this work goes beyond the 1800 completion of the vegetation survey and goes into the night, final interview done at 2045, while everyone was at the dinner at Captain Callistus' place (DT left early for that reason)

0800 BW began prepping a PVC rig for sampling at depth in well "q"

0830 VB/BW got chloride samples at depth in the reverse conductivity gradient well. The method utilized the leftover PVC pipe and tested at a different well. So far the method was successful but the water level is low so we will try later when the water level is up.

0845 MK/AJ listened to Bruce's news: still high surf advisory in effect but dropping, 8ft SW, winds supposed to calm down on the weekend; Dr. Jenson wants to check in with us at 0930

0930 Radio with Dr. Jenson
MK not feeling good → resting
BM/AJ attempt elevation measurement of the tide gauge relative to the well closest to the coast

0945 VB/BW headed to taro patch to collect conductivity measurements around the perimeter and possibly in the middle. 19 measurements taken with 18 GPS points on the 60 CSx Garmin. Due to low water level not all measurements were made in the taro patch. Some were taken just outside of it in ponds dug out to soften coconut husks. Also since the taro patch water level was so low and the taro very thick and hard to traverse we were unsuccessful in obtaining a measurement or GPS from the middle of the patch. → Finished at 1300; accompanied by guides Mark and John.

1030 MK/AJ resurvey first set of wells where diameter was not taken and RWCS of first day (some information was not taken the first day like whether water flowing into tank was filtered; Guide: Callistus

1200 Lunch with fresh sashimi and fried fish provided by captain Callistus

1330 MK/AJ continued resurvey → Finished at 1500
BM conducted a reconnaissance field survey of the northern and eastern coast of the island in search of useful geologic and other evidence of sea-level change and storm record; checked micro-atolls and level laser meter (this morning after having trouble locating laser point on staff at tide gauge, giving up and plan on trying to continue tomorrow early morning before the sun gets too bright but then laser meter accidentally falls off tripod into water → we try to save it by drying it right away and adding desiccant but it won't turn on again!)

1440 BW/BM collected at depth sample from well "q" using PVC pipe method. The method was probably too aggressive for such a short water column. When reading the sample in the collection bag the conductivity did not match the in-situ conductivity measurement. Still collected the final chloride sample for analysis back in Guam.

1700 Meeting in front of church requested by island youth group as they wanted to perform something for us; they gave us beautiful mwarmwars and put white powder on us, sang songs for us, and gave us food to take back;

1900 Beautiful sunset – walking with Dominic to captain Callistus place in Iyeur for dinner – amazing local food (esp. octopus), more fresh coconuts (we each must have had 3-4 every day). We talked to our captain about the departure the next day; we anticipated departing at noon but he said 1600 is good; we then asked if it would be possible to make it 1800 to leave at sunset which he was fine with. Group meeting at camp led by DT and MK to organize gifts and payment for our guides and cooks plus other supplies to give away to community.

**Saturday - August 22, 2015**

0600 DT goes to the taro patch to photograph cultivation practices, then goes on a full walk around the island, goes clockwise and passes BW at the opposite side of the island (BW going counterclockwise), DT makes several excursions inland, the purpose of the walk is to take as many photos as possible of people engaging in different daily activities related to water

0630 BM goes to get coral samples during the morning low tide; two slabs of microatoll rims were cut for long term sea-level change trend analysis.

0630 BW goes to a sightseeing walk around the coast of the island to collect shells, returns at 1000
MF feels very sick (later figure that it was due to ingestion of *E. coli* sample), stays back
VB/AJ/MK walk to northern tip to check potential drone landing area for future reference; same area where BM gets his coral sample from the microatoll;

1100 VB/BW Last measurements taken at wells "q", "p" and "t" removed all loggers.
They also collected the final round of data parameters when the loggers were retrieved. Completed this at 1130. Helped by guides Mark and John. When finished, they passed out gifts prepared for Mark, John, and Ramon.
We donated the 4 pieces of plywood and total 20ft of PVC to Chief Manu for the community.
BM disassembled tidal gauge and recovered the water level logger.
BM collected water samples from catchment tanks that collect water from zinc-coated roofs for zinc content analysis

1300 DT returns from island walk, goes to photograph the practice of washing laundry in the ocean

1330 VB downloaded files from all loggers and saved on laptop and thumb drive,
also left on loggers as another back up.

1500 DT works with Peter Tewasilpiy and Mark Tachiemai (school principal) to audio record the names of all households, vegetation plots, plant species, and a variety of other terminology (place names, etc.) and transcribe them using Woleaian orthography, so that usage of local toponyms and terms in reports would be accurate
→ This lasts until at 1800, ends shortly before scheduled departure time

MF sick all day. The rest of the team spent time packing and spending some final moments with new friends from Ifalik. Loaded up our cargo in the late afternoon and departed around sunset. Everybody packed up or ran around to purchase or trade for local handicrafts. Quick visit to Angelita's house for more mwarmwars for everybody. Final goodbyes and getting a ride on local canoes to our ship.

1900 Departed Ifalik.

**Sunday - August 23, 2015**

0600 Arrived in Eauripik, ship stays outside the lagoon because of the lack of pass through the reef.

0700 DT and BM swam to shore; the rest of the team picked up one by one by a small local canoe.
MF still very sick and stayed on ship.
When we arrived on the island, mass was in progress (most of us joined for a bit).

0830 Back at men's house; chief wasn't feeling well, so a village elder named Eddie (whom MF/MK had also met with the chief on the Caroline Voyager in 2014) represented him; We gave them our gifts and explained our mission.
0900 BM conducts a reconnaissance walk to search for evidence of sea-level change and storms
0900 DT conducts interviews with local leaders and residents
0900 The rest of the team started household survey with guide Ali (from the dispensary); also stopped by chiefs Manuel Bulgar's house (he wanted to meet us and take a picture with us); AJ checks in with Bruce after the daily news; coming across birthday boy who was lavishly decorated with mwarmwars; surveyed all households, took location and brief description of wells and all catchment tanks but didn't measure catchment areas; about seven wells and 16 rain catchments; four samples collected for *E. coli* testing (one well and three rain catchments) giving photos from MF/MK from last trip to people, which they really enjoyed; (including older lady called Rita who offered us turtle to eat); also enjoying faluba on beach (they currently have a ban on Ifalik); water was super-glassy, very scenic; drinking more faluba at men's house (where DT conducted interviews); they mention that they can only kill turtle when chief is on island, one large turtle can feed the whole community; afterwards the woman put lavalavas on us girls, then about 10-15 woman performed a dance for us right on the beach; some traditional with their skin covered in tumeric but most were wearing t-shirts; after the dance, many followed us to the other side of the island where out was waiting to say goodbye; an overall very welcoming experience; we were supposed to leave by noon the latest but the faluba and prospect for a dance changed our minds.
1400 Departed Eauripik

Dinner, compliments of the crew with fresh sashimi and rice;
Beautiful starry night with very calm water – amazing!

**Monday - August 24, 2015**

Perfect conditions – very calm ocean again!

VB Checked *E. coli* samples from Eauripik. Three presumptive positives.
Somewhere between Eauripik and Sorol captain stops boat so we can all jump in for a swim.

1500 Arrived to Sorol Atoll
Captain dropped us off at "Bird Island" (called that for a reason)*;*
Lots of turtle tracks and nest all over; saw a crab with a dead baby turtle in its claws
Stayed on "Bird Island" for about two hours although captain told us he would be back in half an hour to pick us up (boat with other crew members went to "Crab Island" to catch us coconut crabs for dinner); around sunset we get to the main island which used to be inhabited (we thought people left due to the effects of a storm but later somebody mentioned the real reason was that chief kicked the people off as they started selling natural resources?); captain drops us off so we can swim in an walk along beach to former settlement (except BM who explores the main islet (Sorol) and other two islets (Bigeliwol and Birara) which are accessible by foot due to the low tide and conducts a reconnaissance search of sea-level and storm record. → we did get worried though as it was getting dark and no sight of BM but he eventually made it back) where we are meeting crew who are preparing our dinner (feast is probably more appropriate) which was served on banana leaves.. local style. While it was still light we walked through the jungle to see some of the remains of the old village. After dinner, we swam back to our boat in the dark.
2100 Departed Sorol

Weather changed and got rather rough and very rainy.

**Tuesday - August 25, 2015**

Still very rainy in the early morning.

0800 Engine stopped (to refill oil) which meant another chance for us to jump in the water!
Latest prediction is to arrive in Yap around 1700 which is a bit of bad timing (we were always planning to arrive in the morning or noon the latest as everything will be close and we can't ship out our big yellow equipment box and return some of other equipment we borrowed
1650 Arrived in Colonia, Yap greeted by Paul Aying, Jerry Fagolimul, Ray Tamow, Martin and others.
1500 VB checked *E. coli* samples again, still no color change for one sample taken from the uplifted rain catchment. The other three were confirmed with UV light as positive for *E. coli*.
1800 Early check-in for MK/VB/AJ/MF/BM (DT/BW waiting for Marge to pick up her things we had borrowed, and things that needed to be returned to EPA and Land Resources)

Dinner at the new bar at Chamorro Bay with Jerry Fagolimul and Ray Tamow.

0135 Departed Yap by flight to Guam.

**Wednesday - August 26, 2015**

0300 Arrived to Guam.

**M/V Mathawal Yap ship log**

| Date | Time | |
|---|---|---|
| 08/12/15 | 1856 | Depart Colonia, Yap Proper |
| 08/13/15 | 1703 | Arrive Sorol (Landed on “Crab Island”) |
| | 1824 | Depart Sorol |
| 08/15/15 | 0346 | Arrive Ifalik (Landed on the main island) |
| 08/22/15 | 1914 | Depart Ifalik |
| 08/23/15 | 0625 | Arrive Eauripik (Landed on the main island) |
| | 1426 | Depart Eauripik |
| 08/24/15 | 1550 | Arrive Sorol (Landed on “Bird Island” and the main island) |
| | 2017 | Depart Sorol |
| 08/25/15 | 1650 | Arrive Colonia, Yap Proper |