IODP Operations Task Force

24 March 2010 Meeting

University of Sydney, Sydney, Australia

FINAL MINUTES (v1.2)

Wednesday	24 March 2010	18:00-19:30

Introduction

Hans Christian Larsen called the Operations Task Force (OTF) meeting to order at 18:10. He asked everyone to introduce themselves. He then presented the agenda for the meeting.

Proposal 537A-Full5 Costa Rica Seismogenesis Project (CRISP)

Hans Christian Larsen presented an introduction to Proposal 537A-Full5. The original CRISP-A proposal included five sites: two sites on the slope (Site 3B and 4A; tentative sites for later riser drilling, CRISP-B) and two sites on the incoming plate, and one toe-site (2A). One of the slope sites (3B) is planned to be a deep riser hole, but the other slope site (4A) is located in too shallow water for riser drilling with the *Chikyu,* and a later deep riser site would need be located in less shallow water (min 500 m). The original CRISP-A proposal also called for CORKs, but those have since been taken out. This is unfortunate, but cannot be changed. The decision was made by OTF that the mini expedition (25 days) based on the CRSIP-A need be a stand-alone project since no more CRISP drilling is likely to happen before end of IODP in 2013. Since a new 3D seismic data set will be acquired and processed in the time frame of 2011-12, upcoming drilling should also consider how coring data and seismics would complement each other. The suggestion was made to drill one toe and one slope site, with the latter potentially in the long-term becoming a deep riser hole. However, to get subsidence history across the area, both sites on the slope would need to be drilled. And this is not realistic within 25 days including the toe site.

An important objective within the upcoming CRISP expedition it to constrain tectonics erosion within the subduction channel, the nature of the basement within the hanging wall and deeply sourced fluid flow out of the hanging wall basement. The proponents approach to do this from fairly shallow drilling is to core the two slope sites well into basement (basement and fluids) and to compare the subsidence between the two sites (mass transportation/tectonic erosion at depth). For the latter to work, both sites are needed. However, based on the available seismic line, it is difficult to tell if drilling would recover comparable sediment packages at Sites 3A and 4A. It is possible, but there is a structural high between the two locations, and there is significant evidence of normal faulting and rotated half grabens (i.e., tectonic extension in addition to tectonic erosion) in the vicinity of the sites. Thus, some subsidence may be due to extensional collapse rather than erosion. Larsen indicated that he does not see this as fundamentally changing the argument for drilling two sites, but it represents an added complexity that need be considered. The new 3D seismic data will be helpful in this regard.

The toe site (Site 2A) would according to proponents only recover deformed sediments transported down-dip from the slope basin (i.e., not accreted per se) as seen elsewhere in the region. Recovery likely would be difficult, but LWD data (do not exists in

the region) likely could provide quite useful information on the stress regime and mode of deformation. However, LWD might not be fiscally feasible (see below).
The OTF therefore accepted the view expressed by the proponents that the most useful information likely would come from focusing on the two slope sites. One of which must penetrate well into basement in order to unequivocally characterize this.

Kasahara asked if one site could be moved to a different location, between Sites 2A (toe-site) and 3A (lower slope site). Larsen asked what would be the motivation for selecting a new site. Azuma agreed with Kasahara, and indicated that the most important task is to understand erosional accretion and that should be used for identifying the most important drill site. Kasahara indicated that if it is believed that 150°C is the beginning of the smectite zone, then there is a concern that the region to be drilled (slope sites) is marginal to the seismogenic zone. Larsen agreed, and replied that the final location of the deep hole into the seismogneic zone has to be in 500 m or more water depth, and thus could end up even more marginal.

Ben van der Pluijm commented that in fact, if the objective is to know what the basement is, this only requires one hole. But to understand the erosional/subsidence history they need to know what goes into the system, and therefore something may be missed without drilling on the toe. He suggested drilling either slope sites Site 3A or 4A, plus one on the toe rather than two sites on the slope. Larsen said the proponents claim that very little material is accreted on the toe (known from other sites in the region), and it is composed mostly of reworked sediments from the slope. Ben van der Pluijm responded that still, what is eroded and incorporated into the toe needs to be known.

Larsen indicated that the proponents have said that with only 25 days of drilling time, they need to target the basement to begin to constrain the erosional history. Barbara John responded that the proponents assume that sediments are being eroded onto the toe. Kasahara asked if it is erosional, why is it flat? van der Pluijm replied that it is the opposite of Nankai Trough – the bottom is eroding. Larsen noted with some concern that the proponents have never addressed the seaward-dipping extensional faults, only shown opposite polarity, landward-dipping faults (convergent?). van der Pluijm noted that if the proponents already know what is input to the toe, then he can understand their rationale; and that the fluid coming out of Sites 3A and 4A would be different, and thus the alteration within the basement at the two slope sites could be different. Larsen indicated that the proponents have mentioned that, and van der Pluijm responded that it might make an interesting story.

Larsen asked if it would be reasonable to drill one hole to recover the entire section, rather than drilling two? van der Pluijm responded that two is always better, and Früh-Green noted that two temperatures would allow for study of clay dehydration at depth. Larsen pointed out that the U.S. Implementing Organization (USIO) has indicated they have not included bit change (i.e., single bit holes), so basement recovery could be an issue, especially since the basement lithology is unknown. Malone estimated that it will take 26 days to reach basement at both sites (based on drilling in other accretionary prisms), and only 25.5 days have been allotted to CRISP A. Gatliff noted that to reach basement in two holes within 26 days would be optimistic. Filippelli suggested selecting the hole that must reach basement, drill that first to the total depth, and then move to the second site and drill as deep as possible in the time allowed. van der Pluijm agreed that it was more important to reach basement at one site. Evans asked how long it would take to drill the frontal prism. Malone responded that it is shallower, so approximately 10 days.

Larsen noted that LWD would be beneficial. Malinverno indicated there was time in the schedule for that. Filippelli suggested choosing the primary site to target basement, and then if there was only a small amount of time left after that, then drill a toe site. Larsen indicated that all three holes would be planned as contingency in case Superfast does not work. Früh-Green asked why CRISP was scheduled to drill before Superfast. Malone replied that it maximized operation time and minimized transit. Gatliff asked what the water depth was at Site 4A. Malone responded that is is less than 100 m, but the *JOIDES Resolution* can drill there. van der Pluijm suggested drilling Site 3A to basement, then depending on how much time was left, select which hole to drill. John asked what would happen if the basement hole took 20 days. Malinverno noted that LWD tools are expensive, and that to save money on tools both holes have to be drilled before logging. Larsen then asked Divins if it was fantasy to suggest LWD when there was worry about enough time to even complete both Superfast and CRISP A. Divins replied that LWD was likely only an option if Superfast did not happen because of a very tight budget. Malone indicated that fuel costs are going to be about $1M more this year, and Allan already indicated there was less money in the total budget this year. van der Pluijm asked if the proponents think LWD is important, and was told that they do not have strong comments about it; it would be nice to have, but not essential. Malone noted that LWD is the way to go because wireline logging is challenging as the holes do not stay open. van der Pluijm indicated that if the fiscal reality to include LWD is only one hole, then target the riser hole (Site 3B). Filippelli agreed that based on the nature of erosion, Site 3B is the first priority and Site 4A is the second priority if there is time. Larsen asked for consensus; there were no objections to the following:

OTF Consensus: Site 3B with sufficient basement penetration (TBD pre drilling) to characterize basement and its fluid regime is the highest priority, and should be conducted first. If time remains to recover the full sediment section at Site 4A, this would be second priority. If remaining time is insufficient to drill Site 4A, and pending number of days left, further deepening of Site 3B might be considered as a contingency plan. Only in the case that LWD is an option, or if both sites 3B and 4A have been completed (i.e., additional expedition time), would the toe-site 2B be a priority.

Logging Options for CRISP A

Alberto Malinverno presented five LWD/logging while coring (LWC) options for CRISP A:

1. $750k – TeleScope + EcoScope + GeoVISION resistivity + SonicVISION. This is a full suite of tools that collects real-time data.
2. $450k – TeleScope + EcoScope. This includes real-time pressure measurement, plus collection of resistivity, porosity, gamma ray, and density data, and could be done while drilling the first hole.
3. $300k – GeoVISION + SonicVISION. This collects resistivity, gamma ray, and velocity data in memory, but has to be done on the second hole as the first hole has to be monitored for hydrocarbons.
4. $300k – GeoVISION + adnVISION. This collects resistivity, gamma ray, density, and porosity data in memory, but has to be done on the second hold as the first hole has to be monitored for hydrocarbons.
5. $200k – LWC (RAB-8). This is a LWC engineering development system that has been used before. It collects resistivity and gamma ray as memory data and would be done on the last hole.

Larsen noted that options 3 and 4 are too risky, so either option 2 or 5 would have to be done. Gatliff asked if it would be cheaper to have the tools loaded onto the ship when needed. Malinvero indicated that the prices listed already take into account loading while in port and then pickup of the tools when finished. Gatliff noted that LWC would be attractive since it is faster. Malinverno replied that there can be complications as you cannot wash down while LWC. John noted that LWC has been tested, and asked if the rocks to be drilled during CRISP A would behave in a similar fashion to those drilled while testing LWC. Malinverno agreed that the sediments would, but it was unknown how LWC would work in basement. Azuma noted that not much is known about core recovery while LWC, and it was generally agreed that CRISP A was probably not the time to test it since the expedition is already time limited. Malinverno indicated that if LWC, the intervals to log would have to be selected very carefully. van der Pluijm noted that the proponents want porosity data, so option 2 ($450k) is the way to go.

Larsen asked if it was concluded that the first priority is to get the first hole (Site 3A) to basement and then the second site would depend on how much time left. If there is time then option 2 ($450 k) would be best. There was general agreement with this. Malone noted that for a vertical seismic profile (VSP), the hole would need to remain open and then only way to ensure that was to case it. Larsen responded that would push the cost close to $1M, and so it was not feasible. Larsen then indicated that OTF should put together a wish list if there is extra money available, which is why LWD was an option.

***Chikyu* Schedule 2010-2011**

Hans Christian Larsen showed a slide with the Center for Deep Earth Exploration (CDEX) 3-year plan for the *Chikyu*, but noted that we needed to focus on the schedule for the next year. He indicated the possible schedule included a possible Shimakita Complimentary Project Proposal (CPP) (73 days) from 20 June to 1 September, the Okinawa expedition (47 days) from 1 September to 18 October, and 84 days for the Nankai Trough Seismogenic Zone Experiment (NanTroSEIZE) from 18 October to 10 January. Azuma noted that NanTroSEIZE is the first priority for *Chikyu*, and that time in the schedule is fixed. The second priority is the CPP, which is riser drilling. Okinawa is a contingency and does not have to happen. If funding for the CPP is secured, there is almost no choice for the start or end date of that expedition.

Filippelli asked what would happen if funding is not secured for the CPP. Azuma replied that it would add extra time to NanTroSEIZE. Eguchi further explained that *Chikyu* drilling would begin in middle August if that were to happen. Kasahara asked if it would be possible to switch the Okinawa and the CPP schedule. Eguchi indicated that the Okinawa project requires special (stainless steel) casing that will not be in place before mid-August. Kawamura asked what the fixed dates on the proposed calendar are. Azuma noted that the problem was with the Bonita fisheries, and that there have been attempts to explain to the fisheries why NanTroSEIZE is so important (for understanding and predicting earthquakes and tsunamis), but for now the end date of operations is 10 January 2011 because of the fisheries. The start date is more flexible, although if the CPP is funded there is only a small amount of flexibility.

Malone asked if the schedule was dependent on the budget. Larsen noted that he hoped to know more about the budget situation by early May, but planning had to begin before then. Evans asked if the length of the CPP depended on finances. Larsen responded that the

maximum amount of operational money available will be just below $20M, and that the number of days for the expedition was based on that. Evans then asked what would happen if the money was spent more quickly (due to potential issues such as losing mud or equipment). Azuma thought that drilling might have to end sooner, but was not sure. Kawamura asked if 73 days for the CPP was fixed. Eguchi replied that it included contingencies, but that much time would be needed to reach the objectives. Kawamura asked if 84 days for NanTroSEIZE was fixed. Eguchi noted that it was not, and discussion with the project management team (PMT) still needed to occur to decide on objectives for the current stage of NanTroSEIZE. Kawamura asked if 47 days was needed for Okinawa. Eguchi noted that this expedition actually needed more time, but could reach some objectives within that amount of time; however, it still needed to be determined how much could be cut from Okinawa and still get useful results.

Other Business

Hans Christian Larsen noted that the next OTF meeting would be at IODP-MI in Tokyo on 26-28 April 2010. The current meeting defined issues to be discussed at the April meeting.

Larsen also asked that the Science Planning Committee (SPC) forward as many proposals as possible to OTF so that a useful drilling schedule could be created.