

CONSIDERATIONS FOR A RAPID RESPONSE TEAM FOR PLANETARY ANALOG EVENTS. L.P. Keszthelyi¹, M.E. Rumpf¹, T.N. Titus¹, C.M. Dundas¹ and G.R. Vaughan¹, ¹U.S. Geological Survey Astrogeology Science Center, Flagstaff, AZ 86001.

Introduction: Some rare geologic events on Earth with high value as planetary analogs require a rapid response, not because they are emergencies, but because key processes are active only briefly or because the deposits are ephemeral. An example of the former is the formation of a spill channel during the initiation of a catastrophic flood. An example of the latter is the very fine-grained airfall deposit from a meteorite impact. It may be decades or even centuries before another opportunity to make these observations arises.

Challenges: There are several difficulties in rapidly placing planetary scientists with the right expertise and equipment at the right place to make the right observations.

Natural Disaster Response. Many of these rare events are linked to natural hazards such as impacts, floods, volcanic eruptions, landslides, and mudflows. These events are of special interest to planetary science because these catastrophic processes tend to have exceptionally high impact on geomorphology. But these events also often precipitate disasters for humans. It is absolutely essential that attempts to collect observations for planetary science do not interfere with disaster response efforts. Ideally, the planetary-focused observations would provide some immediate benefit to the disaster response efforts. Failing that, they should explicitly include obtaining data that is of high priority for disaster response agencies to improve their future responses. This requires established and clear lines of communication with those agencies. Trying to initiate such relationships during a disaster is not an option. Instead, the relationships between a planetary analog rapid response team and the disaster response agencies need to be developed outside the context of an actual event. If it is not explicitly clear that the team is welcome in the event, they must not be deployed.

Safety of the Team and Liability. The geologic events to be observed can be unusually hazardous. Furthermore, the event may occur in a location with special safety concerns (both natural and human caused). Organizational rules and procedures alone have only a limited impact on actual field safety. Safety procedures need to be instinctive “muscle memory” and cannot require deliberate effort. This type of safety is inoculated through repeated action, not just of individuals but of a whole team. This establishes an enduring culture of safety.

Most organizations do not have the legal infrastructure to purposefully send employees or staff into these kinds of environments. In other cases, the rules are too restrictive to allow dynamic adjustments to experiments in such unpredictable circumstances.

International Diplomacy. Natural disasters are politically sensitive events and therefore close coordination with the U.S. Department of State is essential for any foreign deployments.

Short Notice Travel. There are logistical and administrative challenges with any short notice travel. This is significantly exacerbated for when dealing with visas and other permissions to travel to some foreign countries. An administrative system accustomed to dealing with these types of issues is essential.

Diversity of Expertise and Equipment. Some measurements require specialized equipment and expert operators. Identifying and deploying the right mix of people and equipment quickly requires prior planning.

Rapid Funding. The need to deploy quickly makes it impossible to use the competitive selection processes used for R&A grants. The institutions that are involved need to have existing agreements that can be utilized instead of relying on new financial arrangement.

Solutions: Many of the legal and administrative issues can be circumvented by utilizing Federal civil servants. NASA has a cadre of well-qualified scientists who can respond to a geologic event on short notice. However, the number of such persons is limited so it could be helpful to include civil servants from other Federal agencies who have relevant specialized expertise. These agencies would need to have existing financial relationships with NASA and ideally would bring existing relationships with relevant international disaster response agencies and the U.S. Department of State. The U.S. Geological Survey is such an agency. Addition of persons not covered by Federal legal protections could be considered on a case-by-case basis.

Suggestions: We suggest three phases to create a rapid response team.

1. Establish a community-driven list of the types of events that deserve a rapid response. For each event, the types of observations that are most valuable should also be identified. A future workshop on planetary analogs would be an ideal venue for creating such a list.
2. Develop protocols with relevant international and Federal groups on how a rapid response team can operate without interfering with (and possibly assist) disaster response.
3. Practice rapid deployments. This is essential for team safety and for solving logistical bottlenecks. Inviting international and Department of State observers to practice deployments within the US is an option to consider when international travel is not practical. It should be possible to obtain data relevant to planetary science during practice deployments.