



RRV Report

Minutes of the TIM



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for the OCO-2 Science Team

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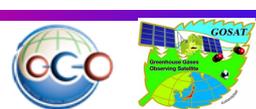
The Ongoing Battle for Railroad Valley

- **Relevance:** Earth Science Missions use the large, homogeneous Railroad Valley playa (RRV) for vicarious radiometric calibration of passive optical instruments
 - RRV is well characterized and instrumented and its surface is ideal for quantitative calibration traceable to international standards
 - Railroad Valley, NV, is the only site in the U.S. that is homogeneous over a large enough area to accommodate large-footprint sensors, such as OCO-2, OCO-3, GOSAT, GOSAT-2, Sentinel 5p, and GeoCarb and for cross-calibration of these instruments with reference instruments, such as MODIS
- **Problem:** Mining claims threaten to disrupt the playa floor, rendering this critical asset useless for large footprint instruments
 - Railroad Valley is under the jurisdiction of the Bureau of Land Management and currently available for multiple uses
- **Objective:** Submit a “Withdrawal” application to preserve RRV
 - To preserve Railroad Valley in its natural state, the OCO-2 team is working with NASA HQ to prepare a “withdrawal application” to preclude the mining and other activities that will disturb the playa floor



GOSAT/OCO Experiments

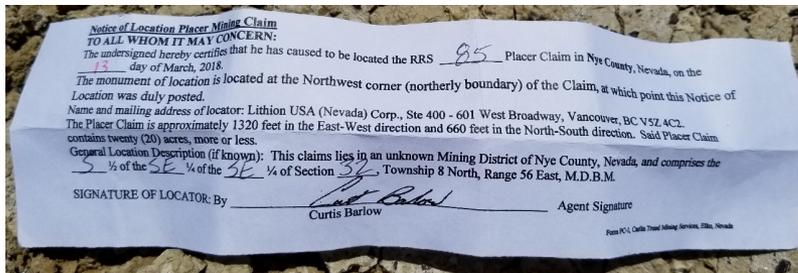
- The OCO/GOSAT programs are examples of large footprint sensors that have been using RRV since 2009
- NASA Orbiting Carbon Observatory (OCO) and Japanese Greenhouse gases Observing SATellite (GOSAT) teams formed a close partnership to cross-calibrate their measurements and cross-validate their products
 - Missions include OCO-2 (2014), OCO-3 (Feb. 2019), GOSAT (2009) and GOSAT-2 (Oct. 2018)
 - All four missions require unprecedented calibration accuracy to meet their demanding (0.3%) data product accuracy requirements
 - Many of their science goals can only be addressed by combining data from all four missions, to produce a harmonized, continuous climate data record that spans the lifetimes of both missions
- Cross-calibration methods pioneered by the OCO/GOSAT collaboration have been adopted as best practice for cross-calibrating atmospheric composition sensors by the CEOS Atmospheric Composition-Virtual Constellation (AC-VC)





Mining claims

- Mining claims filed in 2018 now threaten RRV
 - RRV is on public land, managed by BLM
 - BLM's charter is to sustain public lands and coordinate shared usage
 - The mining act of 1872 authorizes mining on public lands
 - The oil industry has explored RRV since the 1980's, but our understanding is that the wells have been abandoned on the playa itself, due to low yield
 - A greater threat to the preservation of RRV are recent lithium mining claims
 - Beginning in March 2018, Lithium Energy Corp, Vancouver, B.C. filed a claim to 10,000 acres at RRV (495 placer claims)
 - Currently, *3PL Links* of Ontario, Canada has made 55 claims and *Lithium Holdings* of Nevada has made 17; additional mining companies are known to have interests in RRV



Example of a placer claim form in RRV

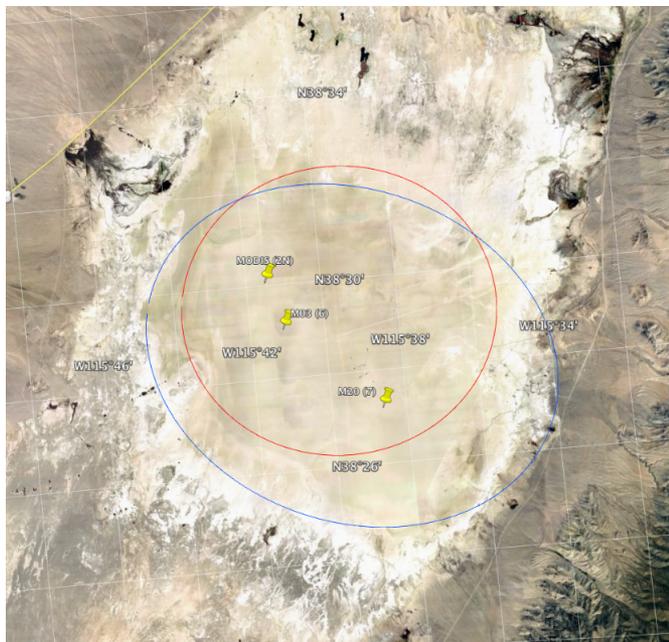


Evaporation ponds like those planned for RRV

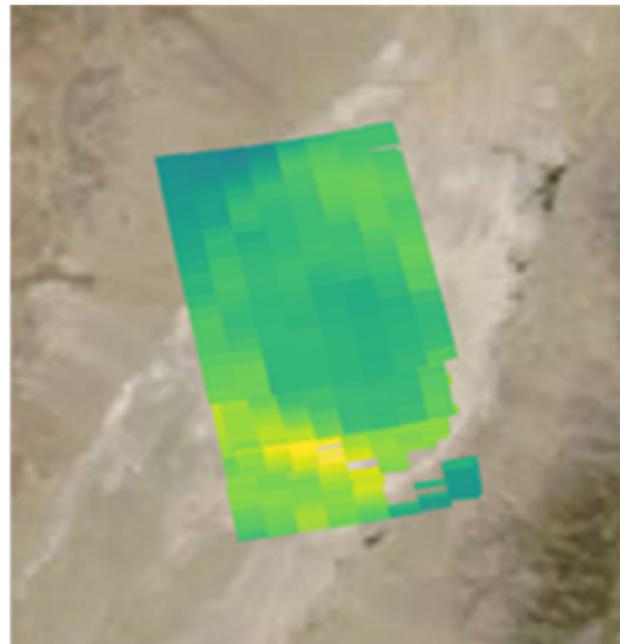


Withdrawal request suitable for AC-VC needs

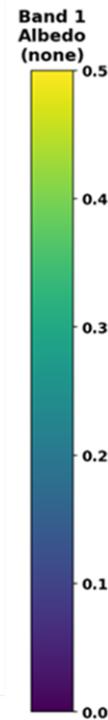
NASA will request that the dry lakebed playa at Railroad Valley (RRV), NV be withdrawn and preserved in its current state so that it can continue to be used for the routine calibration and validation of Earth observation instruments flown by NASA and its partners. The subject area of NASA's withdrawal request is an approximately 43,000-acre flat playa.



GOSAT footprints on the RRV Playa



OCO-2 Target Observations over RRV





Summary and Prospects for RRV

- The Railroad Valley playa is a critical surface calibration site for several operating and planned Earth Science missions by NASA and its partners.
 - Only instrumented site within the U.S. that is sufficiently homogeneous and undisturbed over a large enough area to enable vicarious calibration of large-footprint instruments, such as OCO-2, OCO-3, GOSAT, GOSAT-2, and GeoCarb.
- Recent mining claims threaten to disrupt the surface of the Railroad Valley playa, rendering it useless for vicarious calibration
- NASA Science Directorate Management has approved the plan to submit a Withdrawal Application that will be submitted to the U.S. Bureau of Land Management to restrict public uses of the RRV playa that disturb the surface
- Wish us luck!

