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Lightning Detection at the Telescope Array Cosmic Ray Observatory HELIO TAKAI, Brookhaven National Laboratory, JOHN BELZ, GORDON THOMSON, WILLIAM HANLON, University of Utah, BILL RISON, RON THOMAS, PAUL KREHBIEL, New Mexico Tech, TAKESHI OKUDA, Ritsumeikan University — It is known that the electric fields measured in lightning clouds are an order of magnitude too small than the critical electric field required for dielectric breakdown of air, there are therefore unknown mechanisms at work which initiate lightning. One theory is that cosmic ray air showers can initiate lightning via a runaway breakdown process. To study this problem, 10 VHF lightning monitoring stations built by New Mexico Tech were deployed at the Telescope Array site on September 2013. If cosmic rays act as lightning initiators, then the TA surface detectors may be able to detect high energy particles from the associated air shower while the NMT lightning detectors simultaneously measure VHF radio pulses of the lightning discharges themselves. The Telescope Array is the largest cosmic ray observatory in the Northern hemisphere. Located in Millard County, Utah, it covers an area of 750 km². The VHF monitoring stations can be used to produce 3D images of the lightning strikes. Using both setups we hope to be able to investigate in detail the role of cosmic rays in lightning, or if there is any gamma ray production from lightning activity. We will discuss how a collaboration between TA, NMT and BNL can help in understanding of a long standing mysteries about lightning formation. Results of data analysis for events that were observed in coincidence between our detectors will be presented.

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