Tai-Long
He
University of Washington
Ryan J. Boyd, Princeton University;
Daniel J. Varon, Harvard University;
Alexander J. Turner, University of Washington;
Oral
Global atmospheric methane concentrations rose by 10 to 15 ppb/y in the 1980s before abruptly slowing to 2 to 8 ppb/y in the early 1990s. This period in the 1990s is known as the “methane slowdown” and has been attributed in part to the collapse of the former Soviet Union (USSR) in December 1991, which may have decreased the methane emissions from oil and gas operations. Here, we develop a methane plume detection system based on probabilistic deep learning and human-labeled training data. We use this method to detect methane plumes from Landsat 5 satellite observations over Turkmenistan from 1986 to 2011. We focus on Turkmenistan because economic data suggest it could account for half of the decline in oil and gas emissions from the former USSR. We find an increase in both the frequency of methane plume detections and the magnitude of methane emissions following the collapse of the USSR. We estimate a national loss rate from oil and gas infrastructure in Turkmenistan of more than 10% at times, which suggests the socioeconomic turmoil led to a lack of oversight and widespread infrastructure failure in the oil and gas sector. Our finding of increased oil and gas methane emissions from Turkmenistan following the USSR’s collapse casts doubt on the long-standing hypothesis regarding the methane slowdown, begging the question: "what drove the 1992 methane slowdown?"
Meeting homepage
IWGGMS-20 Workshop
Download to PDF