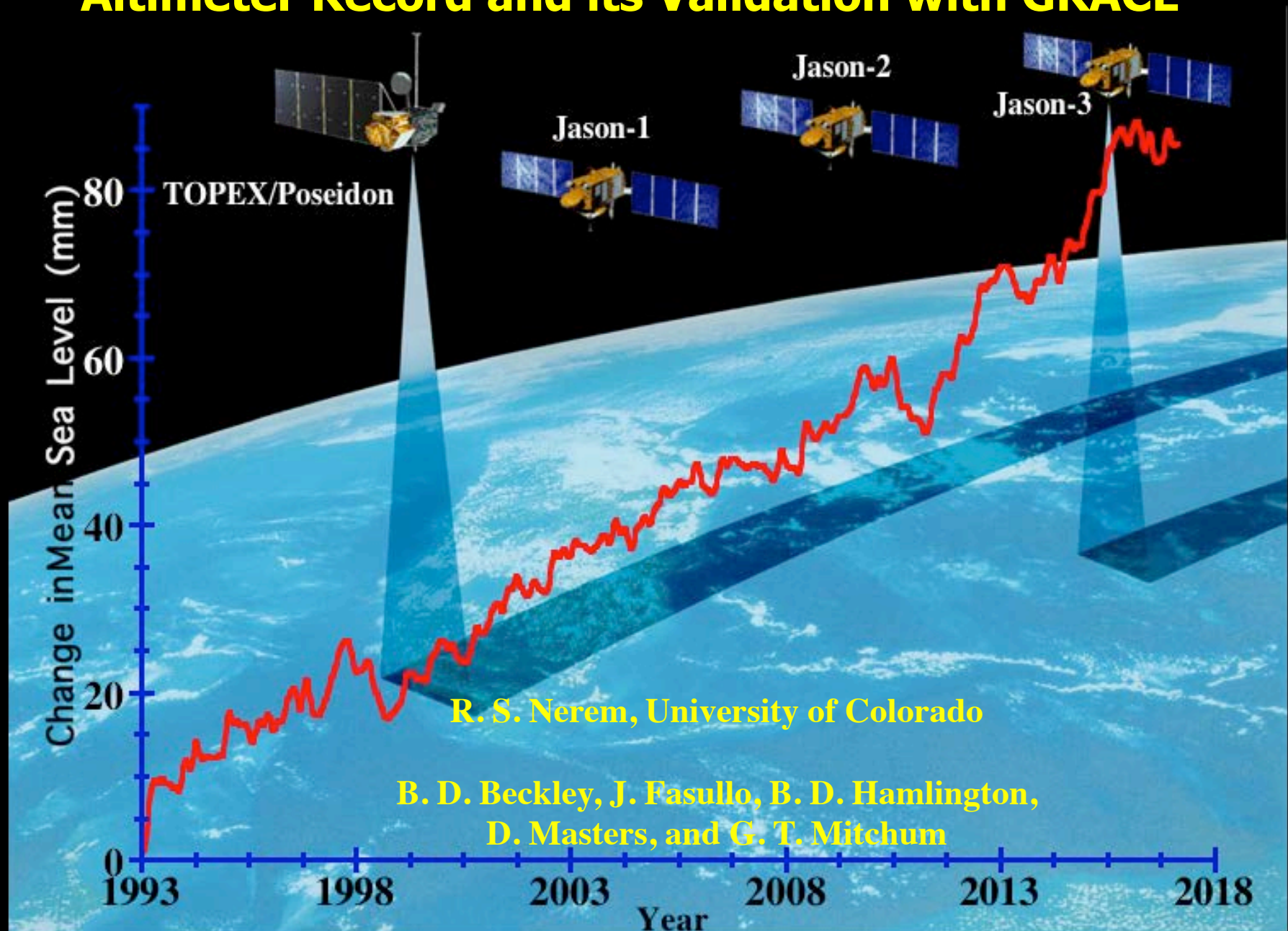


# Detecting the Acceleration of Sea Level Rise in the Satellite Altimeter Record and its Validation with GRACE



**Abstract:** We now have a 25-year record of global average sea level change from satellite altimeter missions such as TOPEX/Poseidon, Jason-1, Jason-2, and Jason-3. This record shows considerable interannual and decadal variability superimposed on a long-term trend of about 3 mm/year. We show that after the interannual and decadal variability is accounted for and after performing a small adjustment to the TOPEX data, the long-term trend is accelerating. If the rate of sea level rise were to continue at 3 mm/year, this would result in 30 cm of sea level rise over a century. However, when this rate is combined with the acceleration we have detected, this would more than double the sea level rise over a century (~65 cm). We have also compared the rate and acceleration of sea level derived from satellite altimetry to the rate and acceleration of ice mass loss as determined from GRACE data (2002-present). When the GRACE results are added to the rate and acceleration of thermosteric sea level change, we found quite good agreement with the altimeter estimates, even though the time periods differ. Determining the acceleration of sea level change will become more robust as the satellite record lengthens. GRACE and GRACE Follow-On will be valuable tools for validating these estimates and pinpointing the causes of the acceleration.