Regional projections of sea-level rise vary significantly between climate models. However, factors controlling the regional distribution of sea-level rise are not understood. A potential contribution to the different regional projections is the representation of various radiative forcing schemes and their associated feedbacks in each individual climate models, particularly the regional differences in aerosol radiative forcing. We use a climate model to identify the regional sea-level responses in various radiative forcing experiments in simulations of the 20th century climate. As part of the CSIRO and the QCCCE contribution to the WCRP CMIP5, the CSIRO Mark 3.6 model has been run from 1850 to 2005 with individual radiative forcings. Each experiment has 10 ensemble members, branching from a different epoch in the first 80 to 200 years of the 500 year pre-industrial control run. We evaluate the regional sea-level response in the experiments ensemble means. We compare these regional responses with the observed sea-level rise in an attempt to identify the main forcing factors for the regional distribution of sea level rise.