Tsunami inundation models typically require high resolution elevation data in the nearshore and coastal environment to simulate flow with sufficient accuracy. This makes them computationally intensive and limits practical application to scenario assessments at discrete communities. This study explores the use of moderate resolution (250 m) elevation data to support computationally cheaper modelling to estimate nearshore tsunami hazard. Comparison with high resolution models using best available elevation data demonstrates that moderate resolution models validly simulate wave height and current speed (errors < 20%) at depths greater than 10 m for low sloping continental shelf environments. In steeper and more complex shelf environments results are only valid at depths greater than 20 m. Modelled arrival times show less sensitivity to data resolution. It is demonstrated that modelling using 250 m resolution data at a sub-national scale can reduce uncertainty surrounding the effects of shelf morphology on tsunami propagation. This can assist emergency managers to prioritise communities for more detailed inundation modelling. However, moderate resolution elevation data is not generally valid for modelling tsunami inundation. Further research is needed to define minimum elevation data requirements for modelling inundation and inform decisions to undertake acquisition of high quality elevation data collection.