01 Introduction

Vertical motion in the Lesser Antilles (LA) is of interest for several reasons. First, it is an example of a subduction zone experiencing an aseismic boundary, which is not expected in a slab dynamo-controlled system. Second, it has the potential to reveal the role of lithosphere-scale geodynamic processes, such as slab dynamics. The agreement between 'global' and 'local' estimates of vertical tectonic motions can provide insights into the nature of the process controlling vertical motion. This study presents a comprehensive analysis of vertical motion in the LA using interferometric synthetic aperture radar (InSAR) and Global Navigation Satellite System (GNSS) data.

02 Vertical GNSS data

GNSS velocities show a margin-wide pattern of subsidence at an average rate of 1.1 ± 0.6 mm/yr, which is in agreement with observations from InSAR and earthquake deformation. However, the vertical GNSS velocities show a margin-wide pattern of subsidence at an average rate of 1.1 ± 0.6 mm/yr, which is in agreement with observations from InSAR and earthquake deformation. This suggests that the subsidence is controlled by large-scale geodynamic processes over time scales of hundreds of thousands of years.

03 Forward models

The margin-wide pattern of subsidence is likely controlled by large-scale geodynamic processes over time scales of hundreds of thousands of years. This is consistent with the long-term subsidence observed in micro-atolls in Martinique over the past 125 years (1.3 ± 1.1 mm/yr). The agreement between 'geodetic' and 'geological' estimates of long-term subsidence is observed.

04 Comparing timescales

Long-term subsidence likely controlled by slab dynamics. The margin-wide pattern of subsidence over the past 125ky to 100 years, likely tectonic in origin. The agreement between 'geodetic' and 'geological' estimates of long-term subsidence is observed.

05 Conclusions

Vertical motion in the Lesser Antilles is an example of a subduction zone experiencing an aseismic boundary. This study presents a comprehensive analysis of vertical motion in the LA using interferometric synthetic aperture radar (InSAR) and Global Navigation Satellite System (GNSS) data. The margin-wide pattern of subsidence is likely controlled by large-scale geodynamic processes over time scales of hundreds of thousands of years. This is consistent with the long-term subsidence observed in micro-atolls in Martinique over the past 125 years (1.3 ± 1.1 mm/yr). The agreement between 'geodetic' and 'geological' estimates of long-term subsidence is observed.