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Recent surface deformation and its geodynamic insights for the Ilan Plain: an extensional basin in northern Taiwan orogenic belt

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The Ilan Plain (Northeastern Taiwan) is a triangular, deltaic plain characterized by a flat topography close to the sea level, and surrounded by the high mountains of the Hsüehshan Range to the north-west, and the Central Range to the south-east. Its eastern coast faces the western tip of the Okinawa Trough, the back-arc basin of the Ryukyu subduction zone. In this study, we analyzed the present-day surface deformation of the Ilan Plain, aiming at deciphering its relationships with the regional geodynamic setting. Our approach is mainly based on surface vertical displacements revealed by Persistent Scatterers InSAR (PSI). When combined with the previous geodetic measurements, and existing geophysical data such as seismic activity, our PSI-derived rates of surface displacement indicate that there is convincing subsidence area, located in the southern part of Ilan Plain and characterized by a rate of about 18 mm/yr. In our seismotectonic model, the Choshui Fault is related the opening of the Ilan Basin and presently borders the area of active subsidence associated with the opening of the Okinawa Trough. Within this context, the reactivation of the Lishan Fault may be seen as a zipper-liked opening process that thus play a major role in the collapse of the northern tip of the Taiwan orogen.