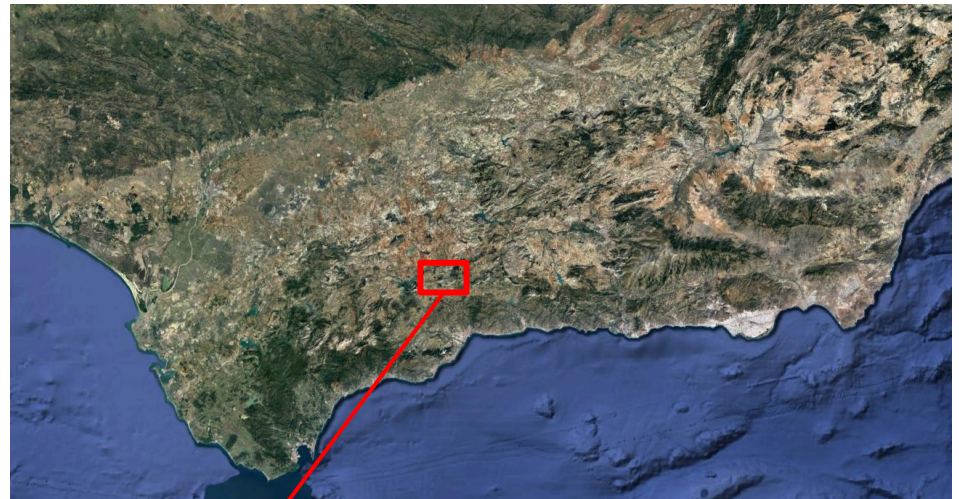


Evidence of recent activity in the Camorro Fault (Central Betics, Southern Spain)

Jorge Pedro Galve, **Cristina Reyes-Carmona**, Antonio Jabaloy, Patricia Ruano, José Vicente Pérez-Peña, José Miguel Azañón and Guillermo Booth-Rea

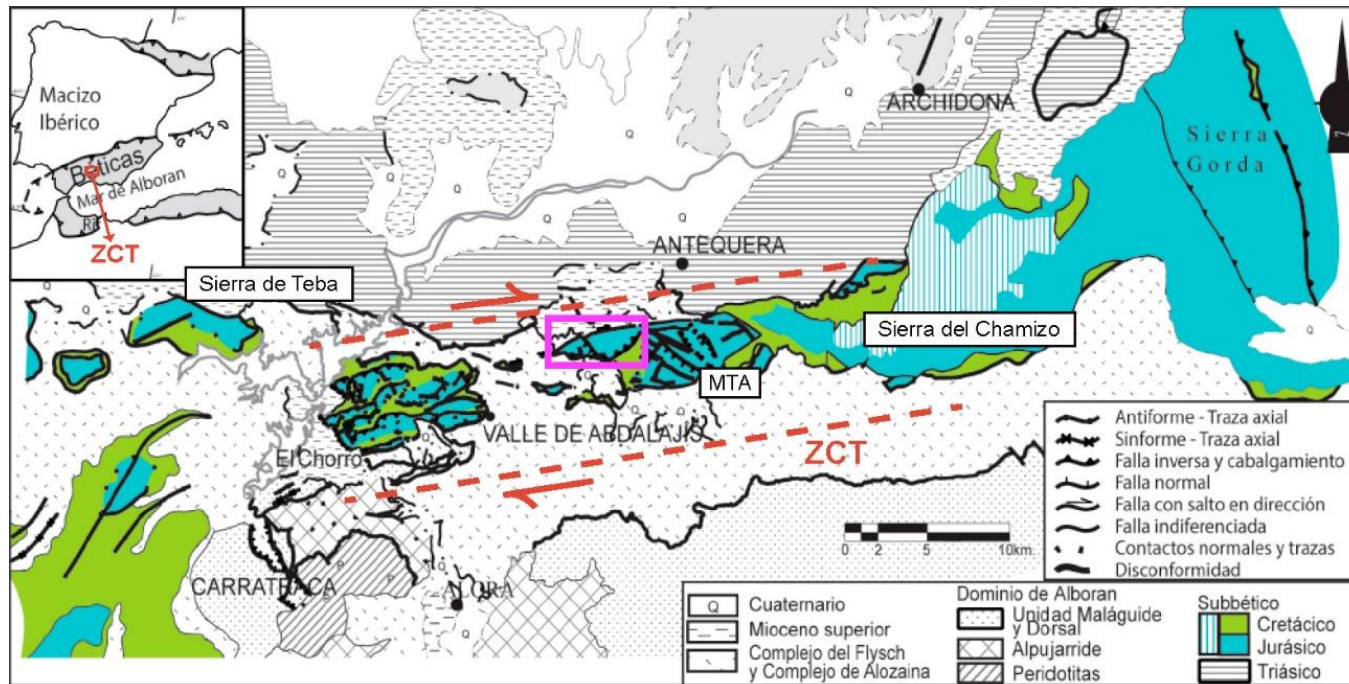


The Camorro Fault



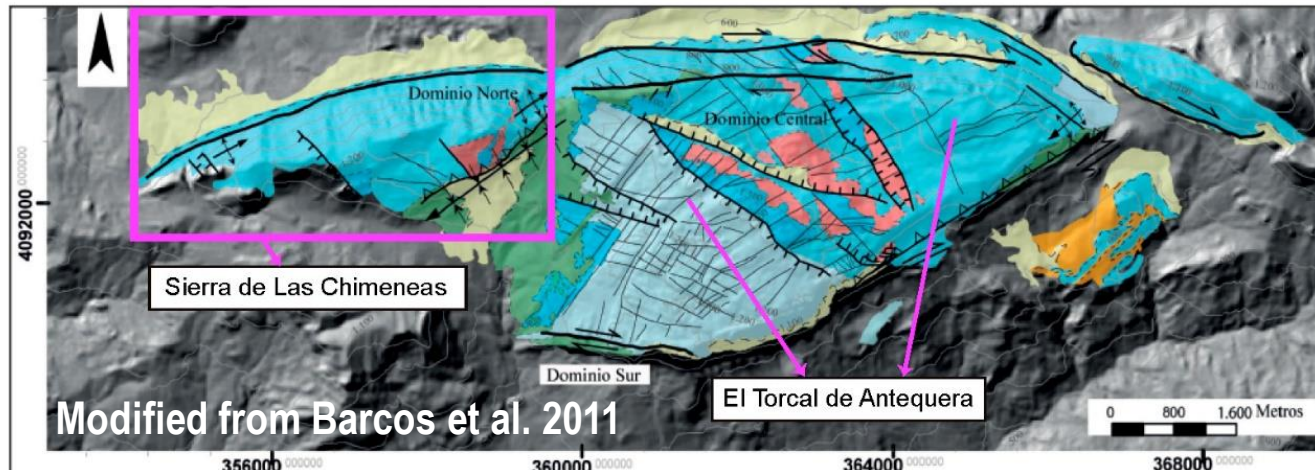
The **Camorro Fault** is located at the foot of the northern slope of a limestone karstic massif that is called 'Sierra de Las Chimeneas', in the central sector of the **Betic Cordillera** (Southern Spain).

The Camorro Fault



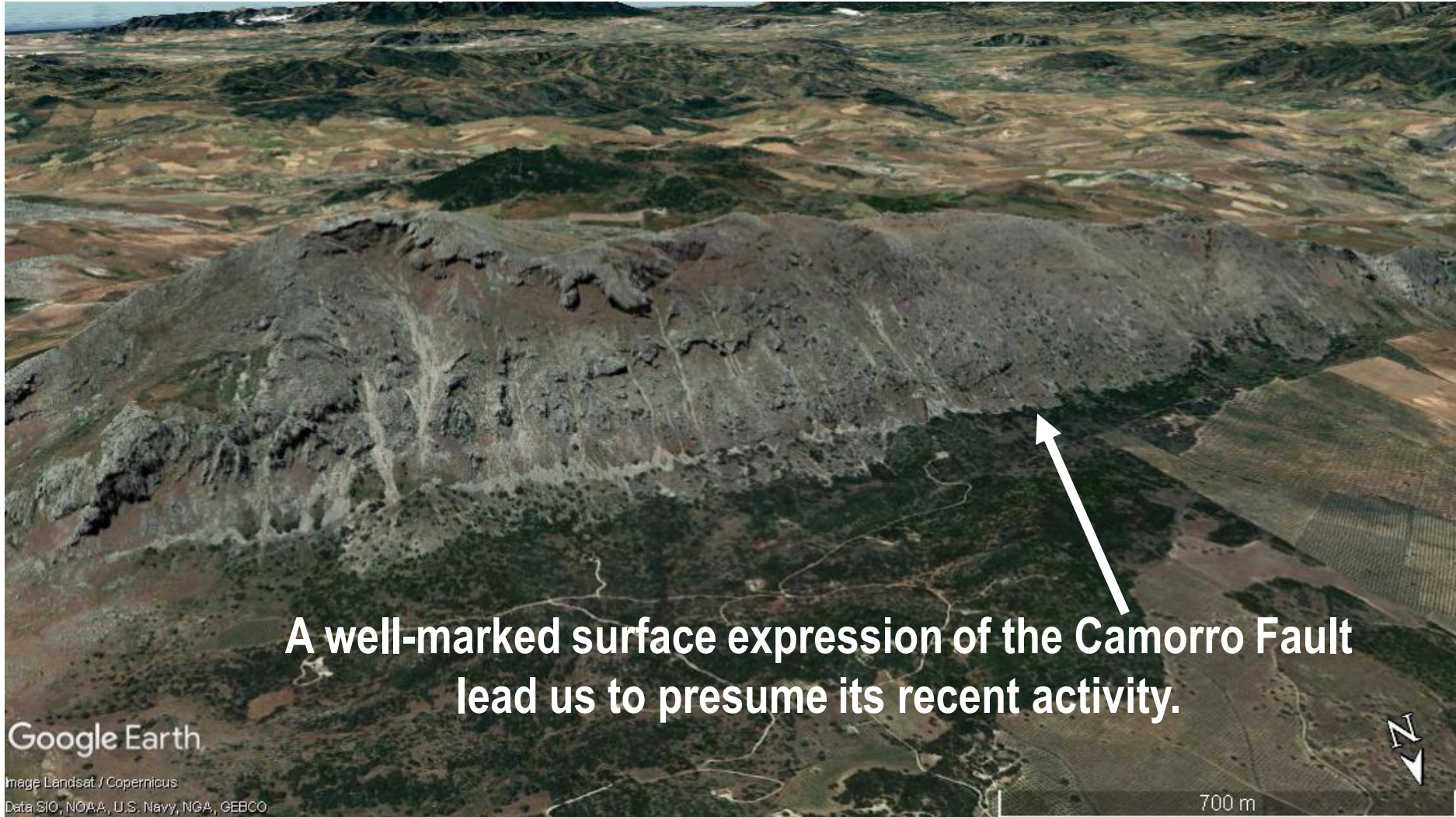
The **Camorro Fault** is a 6 km-length strike-slip with extensional component fault that forms part of the **northern limit of the Torcal Shear Zone (TSZ or ZCT)**.

This fault can be continued 7 km eastward along the foot of northern slope of the '**Torcal de Antequera**' (Málaga), World Heritage Site since 2016.



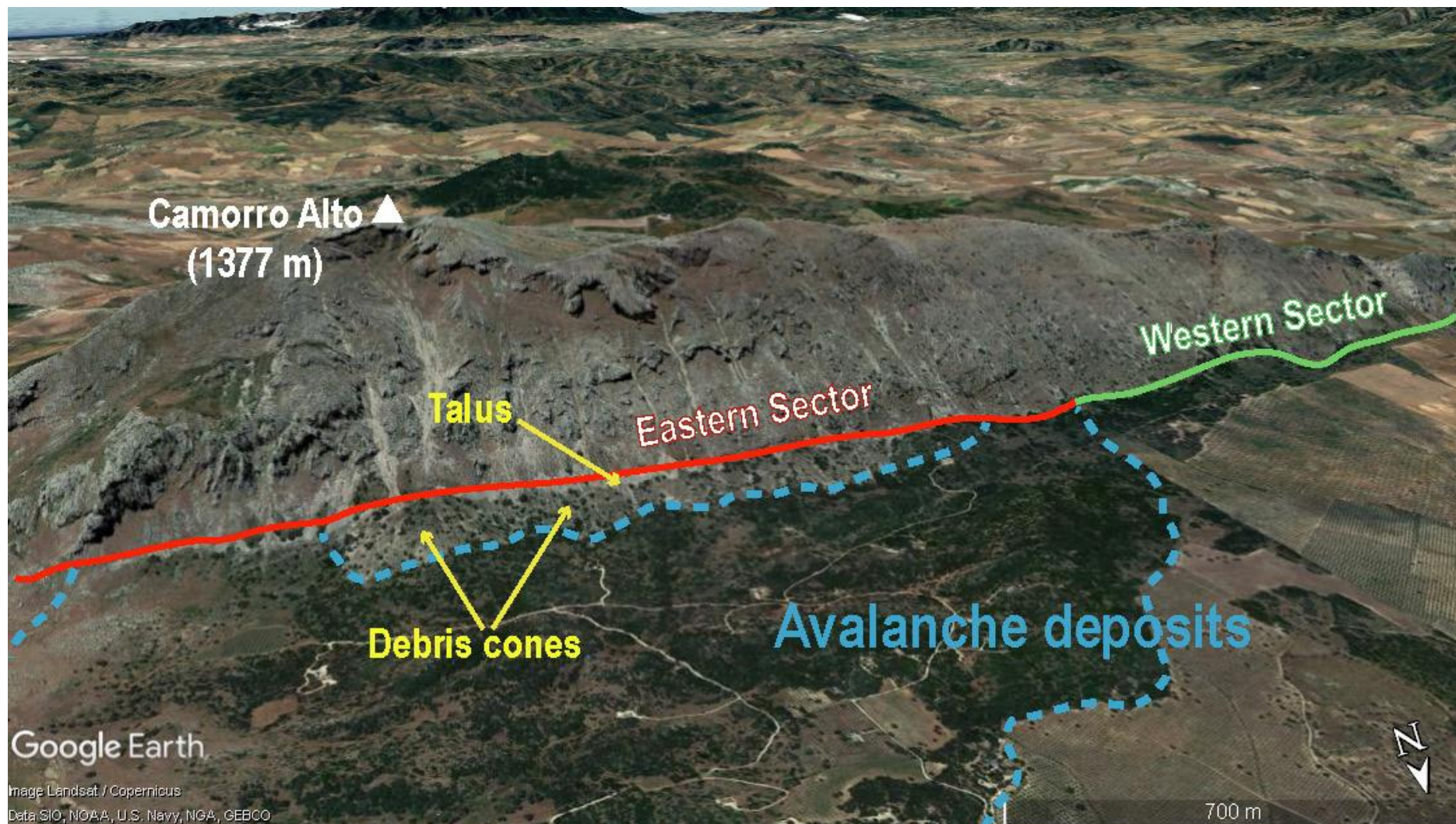
Modified from Barcos et al. 2011

The Camorro Fault



A well-marked surface expression of the Camorro Fault lead us to presume its recent activity.

The Camorro Fault: two different sectors

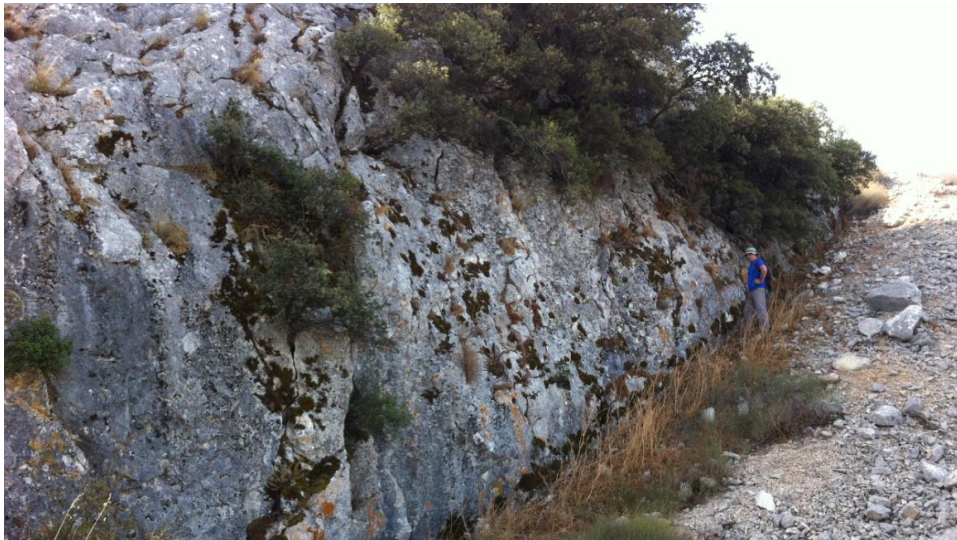


The Camorro Fault: Western Sector



The **Western Sector** of the Camorro Fault is characterised by a **well-exposed fault scarp** that shows some **kinematic indicators** such as grooves or striae on iron-stained surfaces.

The Camorro Fault: Eastern Sector



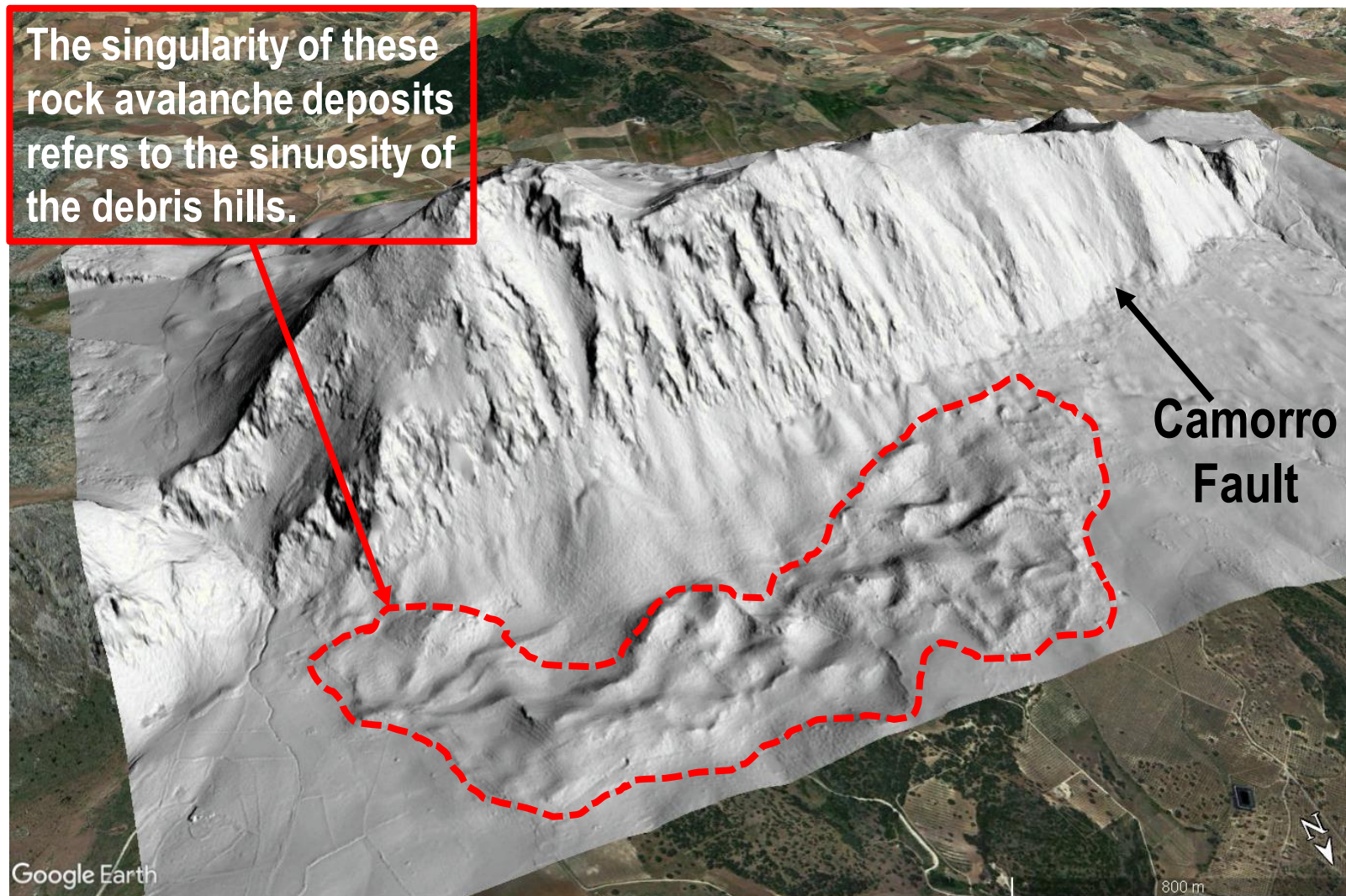
The **Easter Sector** of the Camorro Fault is characterised by a **fault scarp** that is almost **covered by talus deposits**. Several debris cones and **rock avalanche deposits are associated to this fault sector.**

The Camorro Fault: Eastern Sector – rock avalanche deposits

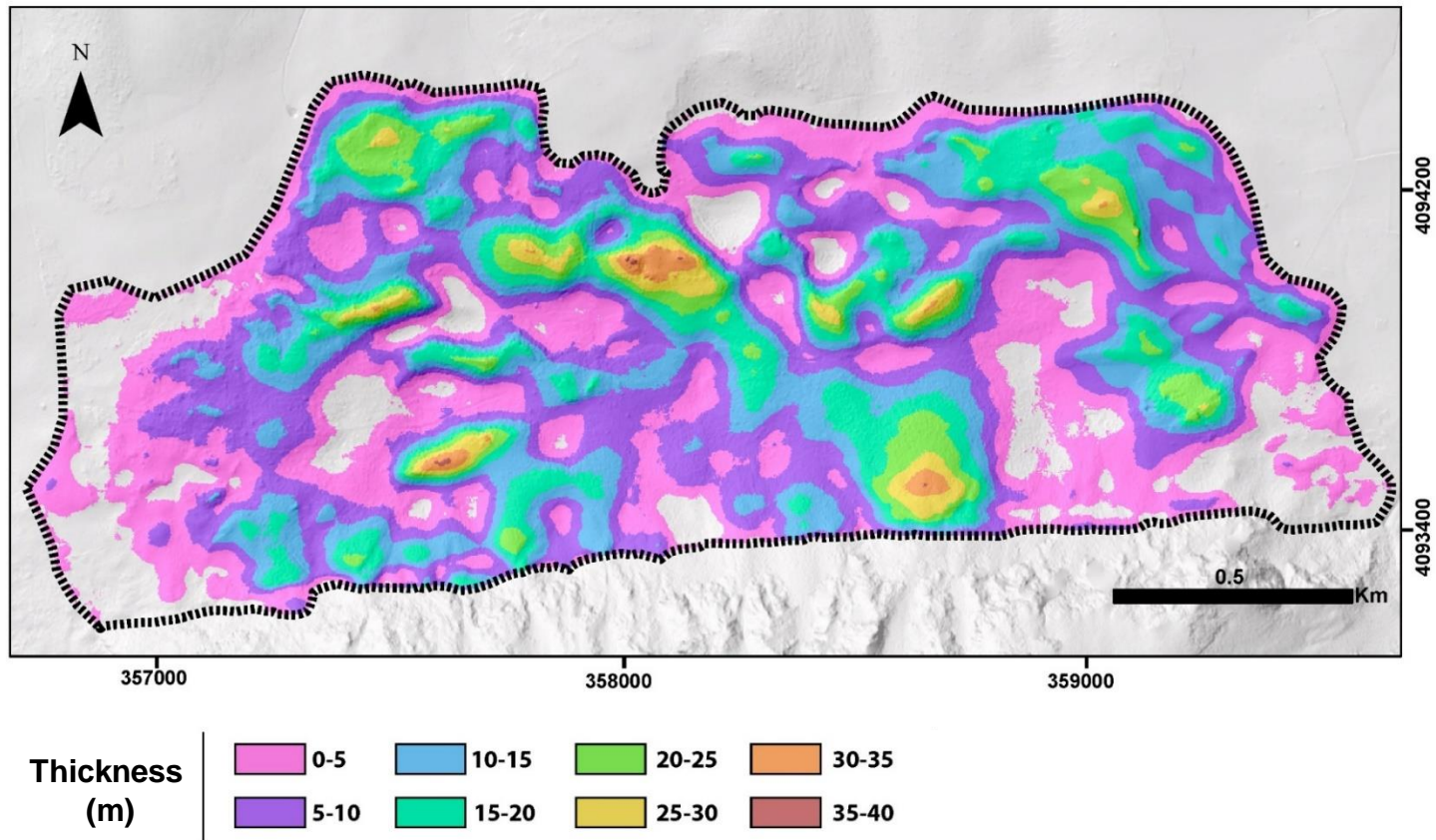


The rock avalanche deposits consist on several asymmetric hills of metric-size debris blocks.

The Camorro Fault: Eastern Sector – rock avalanche deposits



The Camorro Fault: Eastern Sector – rock avalanche deposits



We have estimated a **volume of 9.5 million m³** for these deposits. Given such dimensions, we hypothesize that the rock avalanche may have been **generated as a result violent phenomena, like earthquakes**. Therefore, we propose that such earthquakes could have been generated by the **Camorro Fault**.

The Camorro Fault Earthquake?

This hypothesis would be also supported by **other investigations** that have already referred to **quaternary seismicity** in this area.



*Photograph of the entrance to the 'El Toro' cave, Torcal de Antequera (**World Heritage Site since 2016**).*

An **archaeological research** (González-Quintero et al. 1996) revealed a period of human occupation in the '**El Toro**' cave, located in the nearby 'Torcal de Antequera'. The research pointed out evidences of the **occurrence of a cataclysm** in the late Copper Age (about **5000 years ago**). Such cataclysm could have been associated to an earthquake.

The Camorro Fault Earthquake?

This hypothesis would be also supported by **other investigations** that have already referred to **quaternary seismicity** in this area.



*Photograph within the Dolmen of Menga, megalithic site of Antequera (**World Heritage Site since 2016**).*

An **archaeoseismic analysis** (Rodríguez-Pascua et al. 2019) in the **megalithic site of Antequera** found **deformation structures** probably linked to oscillations between the megalith orthostats **during an earthquake**. This megalithic site is located just 5 km away from the Camorro Fault.

The Camorro Fault Earthquake? Work still to be done...

According to all of mentioned research, the **Camorro Fault** could be a good candidate to account for such prehistoric earthquake.

BUT HOW COULD WE CONFIRM THIS HYPOTHESIS?



GEOCHRONOLOGY (cosmogenic isotopes dating)

The next step is to **date the fault scarp of the Camorro Fault and the associated rock avalanche deposits**. If cosmogenic and archaeological dates coincide, we could attribute all the mentioned observations to an earthquake in the Camorro Fault.

Thus, we could contribute not only to the history of human occupation of the World Heritage Site but also providing insights into the earthquake recurrence and seismic hazard of the region.

References

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González-Quintero, P., Rodríguez-Rodríguez, M.C, Martín-Socas, A.C., Càmlich-Massieu, M.D. (1996). *Rubricatum*: revista del Museu de Gavà 1, 161-167.

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Thank you so much for reading!



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