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## Impacts, vulnerability and resilience of Geoheritage to Climate Change in the four Canary Islands National Parks (Spain)

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Climate change causes impacts on the Earth system, negatively influencing biodiversity, habitats and ecosystems, with strong repercussions for human beings. Climate change also has a negative impact on the Geodiversity, which is perceptible on a human time scale in degradation and loss of geoheritage in volcanic islands. Thus it is urgent to develop research to evaluate the effects of climate change and its influence in geoconservation and public use in protected natural areas. It should also be noted that geoheritage is made up mainly of natural elements of a non-renewable nature, the loss of which is irreversible.

During the last decades, the economy of the Canary Islands has been closely linked to the public use of its Protected Natural Areas and to the tourism activities related to them. Given the great importance of the geoheritage included into the four National Parks of Canary Islands for multiple tourism sectors and indirectly for other sectors, it is not surprising that it is a matter of concern, and of urgent need, to explore the possible responses of the geosites to the climate change scenarios that several IPCC models have simulated for the coming decades in Spain and, specifically, for the Canary Islands. In this case, where the geosites of the Canary national parks have legal protection, their conservation status is not homogeneous and some are threatened in the short and medium term, with a high risk of degradation, which makes them worthy of forming a 'Red List of geoheritage'.

The most threatened geoheritage of the Canary National Parks has been identified in order to assess their vulnerability and risk of degradation due to the impacts of Climate Change. For this purpose, measures have been designed to assess the conservation status of the most threatened geosites whose evolution over time is not well known, including monitoring of active processes triggered by climate change. The use of direct and indirect mitigation measures, including public participation,

have been considered to increase their resilience and adaptation.

With the 'Red List' geosites, the creation of a Digital Image Bank and full-scale replicas of sedimentary structures, fossils and minerals will be implemented as a preventive conservation measure. This climate change adaptation measure for geoconservation is very innovative and fully replicable and reproducible in other national and international protected natural areas. This Image Bank and the Replicas will also be a very effective tool for management as a transfer to public administrations and society whose main objective is to be able to digitally recreate the most threatened geosites, whose loss may occur within 100 years.

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