



PROTECT Project

PRediction Of The Erosion of Cliffed Terrains 2001 - 2004



*Project Partner: Isle of Wight Centre for the Coastal Environment,
Isle of Wight Council, UK*

Background

A large proportion of the European cliffed coastline is subject to erosion and recession. This dynamic process continually exposes fresh geological features and materials to changes in the hydrogeological and mechanical stress regimes. The assessment of cliff-line recession is an important factor in land-use planning.

The erosion of coastal cliffs is inevitable. The cliff collapses are a hazard, a problem for coastal land use planners and limit the use of the coastline as an amenity. Techniques to monitor the rock mass adjacent to a cliff face are poorly developed and hence alerts of impending catastrophic failure can only occur once movement of the cliff face has started. If rock mass parameters can be used to assess the state of a cliff then coastal managers will be better placed to manage the cliffed coastline, improve safety and make more informed land use planning decisions.

Partners

The PROTECT project is as a European consortium of researchers and end users, supported by the EU 5th Framework R & D Environment and Sustainable Development Programme. Partners comprise:

- Lead Partner: British Geological Survey
- University of Brighton
- Bureau de Recherche Géologiques et Minières
- Geological Survey of Denmark and Greenland
- Institut National de l'Environnement Industriel et des Risques
- Isle of Wight Centre for the Coastal Environment
- Direction Departementale de L'equipement de la Seine Maritime
- Urzad Morski w Gdyni
- Consorzio Ferrara Ricerche

Funding Stream

PROTECT is a project commissioned by the European 5th Framework Programme.

Total Budget = € 1,575,139

IWC Budget = € 61,620

Objectives of the project

The objective of PROTECT is to test geophysical methods of measuring time dependent movements in rock slopes.

A noninvasive geophysical technique, azimuthal apparent resistivity (AZR), is being applied to measure temporal changes in anisotropy of the rock mass near the cliff edge. Increased tension (dilatancy) within the fracture network will increase the anisotropy. Hence a relative measure of the increased anisotropy will indicate sections of cliff where the fracture tension is increasing. The project aims to determine if the dilatancy can be measured by AZR, how large is the zone near the cliff edge that is affected and if a relationship can be determined between the changes in AZR and the onset of a collapse.

In addition, a microseismic monitoring network has been emplaced in the cliff in two vertical and three horizontal boreholes. The microseismic method detects the acoustic emissions generated by cracking and will enable the location of the fracture undergoing cracking to be determined. The project aims to determine the relationship between the seismic activity and the onset of failure.



Results

The PROTECT results indicate that each geophysical technique is suited to a particular type of geology, but not to all the geological situations investigated. Hence, the detailed engineering geology is an essential prerequisite to the interpretation of results and the application of the techniques.

Supporting the Isle of Wight

The results and advancements in knowledge made by the PROTECT Project are of great value to the Isle of Wight, which has many vulnerable coastal communities at risk from landslide and rock fall events.



