

## UPPER MIDDLE RHINE VALLEY

World Cultural Heritage since 2002

### Engineering geological conditions and problems:

In the Middle Rhine area the subsoil consists of Lower Devonian low-grade metamorphic claystones, siltstones, slates, and quartzitic sandstones which were folded, scaled off and partially thrust-over during the course of the Variscan orogenesis. During the process of folding the rocks were cut through by a system of longitudinal, transverse, and diagonal joints as well as faults, fault systems and quartz veins.

At the surface the rocks are in parts strongly loosened due to intense tectonic deformation, erosion unloading and physical and chemical weathering.

The top layers of the Rhine valley slopes consist of loamy debris or debris bearing loam. Along the valley floodplains alluvial clay, sands, and gravel occur.

At some historic buildings, mostly castles and some churches, settlement damages and cracks do occur due to weathering and loosening up within the foundation grounds or retaining masonry walls. Creeping within the top soil and rock weathering zone, slumping which progressively reaches into the foundation of buildings as well as isolated rock slides can locally threaten the stability of buildings and the safety of roads.



*Castle Stolzenfels*

### Other information:

In 2002 the UNESCO included the Upper Middle Rhine Valley, one of the most beautiful parts of Germany which has been cultivated since ancient times, into its World Heritage List.

A sequence of castles and palaces extends from the old Roman town of Koblenz to the legendary Loreley precipice, along the steep bluffs where the famous Rhine wines are grown.

### References on studies already performed:

Source: Geologisches Landesamt Rheinland-Pfalz.