Abstract  The historical site of Bamiyan is affected by geomorphological deformation processes which were enhanced during the talibans’ bombing in March 2001, when the two standing Buddhas, dating back to VI C. a.D. were destroyed. Not only was invaluable cultural heritage irremediably lost but also the consequences of the explosions, as well as the collapse of the giant statues, added greatly to the geological instability of the area. Traces of rocks recently slid and fallen are relevant proofs of the deterioration of its stability conditions and most parts appear prone to collapse in the near future.

Under the coordination of the UNESCO, a global project to assess the feasibility conditions for the site’s restoration was developed; field data were collected and a mechanism for the potential cliff and niches’ evolution was provided. In the mean time some consolidation works were carried out in the most critical rock fall-prone areas to avoid any further collapse in the coming winter season, but also to enable archaeologists the safe cataloguing and recovering of the Buddha statues’ remains, still laying on the floor of the niches. The Emergency activities started in October 2003 and included: the installation of a monitoring system, the realization of temporary supports for the unstable blocks, the stabilization of the upper-eastern and upper-western part of the small Buddha niche, the minimization of the environmental impact of the actions taken. Consolidation works were mainly implemented by professional climbers, directly operating on the cliff.

Keywords  Rock fall • Mitigation works • Buddha Statues • Bamiyan – Northern Afghanistan

10.1 Introduction

In the great valley of Bamiyan, 200 km NW of Kabul, central Afghanistan, two big standing Buddha statues appear to visitors (Fig. 10.1), carved out of the sedimentary rock of the region, at 2500 m of altitude. Following the tradition, this remarkable work was done by some descendants of Greek artists who went to Afghanistan with Alexander the Great, probably around VI C. a.D..

Under the worldwide astonishment, the two statues were demolished on March 2001 by the Taliban, using mortars, dynamite, anti-aircraft weapons and...
The Buddhists as well as the world community, UN and UNESCO failed to convince the Taliban to avoid the destruction of this unique cultural heritage. Nevertheless, since 2002 UNESCO is coordinating a large international effort for the protection of the World Heritage Site of Bamiyan and the future development of the area.

10.2 General Features of the Area

Extensive investigations were conducted on the site, even with the limitation of field investigation due to landmines. In detail the following activities were performed in the period 2002 until now. Most of collected information are reported in Margottini (2003b), Margottini (2004a), Margottini (2007) and Margottini et al. (2005), and developed according to the standards and procedures described in Hoek and Bray (1994) and Turner and Schuster (1996). Developed activities include:

1. the inventory of geological and geomorphological feature and existing mass movements;
2. the identification of predisposing factors to slope instability (climatology, petrology, mineralogy, sedimentology, seismology, geophysical properties of rocks, mechanical behaviour of both rock masses (in situ and laboratory) and discontinuities, discontinuities distribution);
3. the investigation of potential triggering mechanisms of landslides;
4. the kinematic analysis to identify potential failure mechanisms for cliff and niches;
5. the numerical stability analysis of cliff and niches, to identify the relationship between shear strength along the potential failure surface and conditions required to trigger the collapse;

Fig. 10.1 The Giant Buddha statues of Bamiyan in a depiction of Burnes, 1834

Fig. 10.2 The Eastern Giant Buddha before and after the destruction

Fig. 10.3 The Western Giant Buddha before, in the explosion and after the destruction