

Report on Preservation Measures in the Eastern Buddha Niche, 2008

Thanks to the good cooperation with the Afghan engineers, craftsmen and helpers it was possible to realize the recommendations and assessments of the Sixth and Seventh Expert Working Groups (see pp. 134–136).

Fragments of the Eastern Buddha Niche

During the last years a lot of Buddha fragments have been removed from both niches and stored in roofed shelters. At the same time all fragments have been numbered and their dimensions, specifics and geological characteristics have been documented. According to a compilation by Georgios Toubekis the total number at the Eastern Buddha is several hundreds (Bamiyan Reports 2006–2007). These fragments are predominantly in both shelters to the west of the niche of the Eastern Buddha. A small number of fragments are still in the Buddha niche or in front of it. It is the matter of 16 very large fragments altogether. So far these fragments could not be transported to the shelters, because a bigger crane has not been available on-site. Thus the fragments were packed in alkathene sheets to protect them against deterioration. As the alkathene sheets had already embrittled by UV radiation, they cracked in some places due to high winds or were even frazzled. Thus the fragments were unpacked and the sheets replaced. On this occasion the already numbered fragments

were photographed, their measures taken, their specifics recorded, and their geological characteristics documented.

Figure 1 shows the list of the fragments KBF001 to KBF016 with their measures and specifics. Figure 2 shows a site plan of the niche where the position of all fragments and the belonging number is drawn in. Figures 3 to 5 show photos of the particular fragments from different perspectives.

Reconstruction of the partition walls

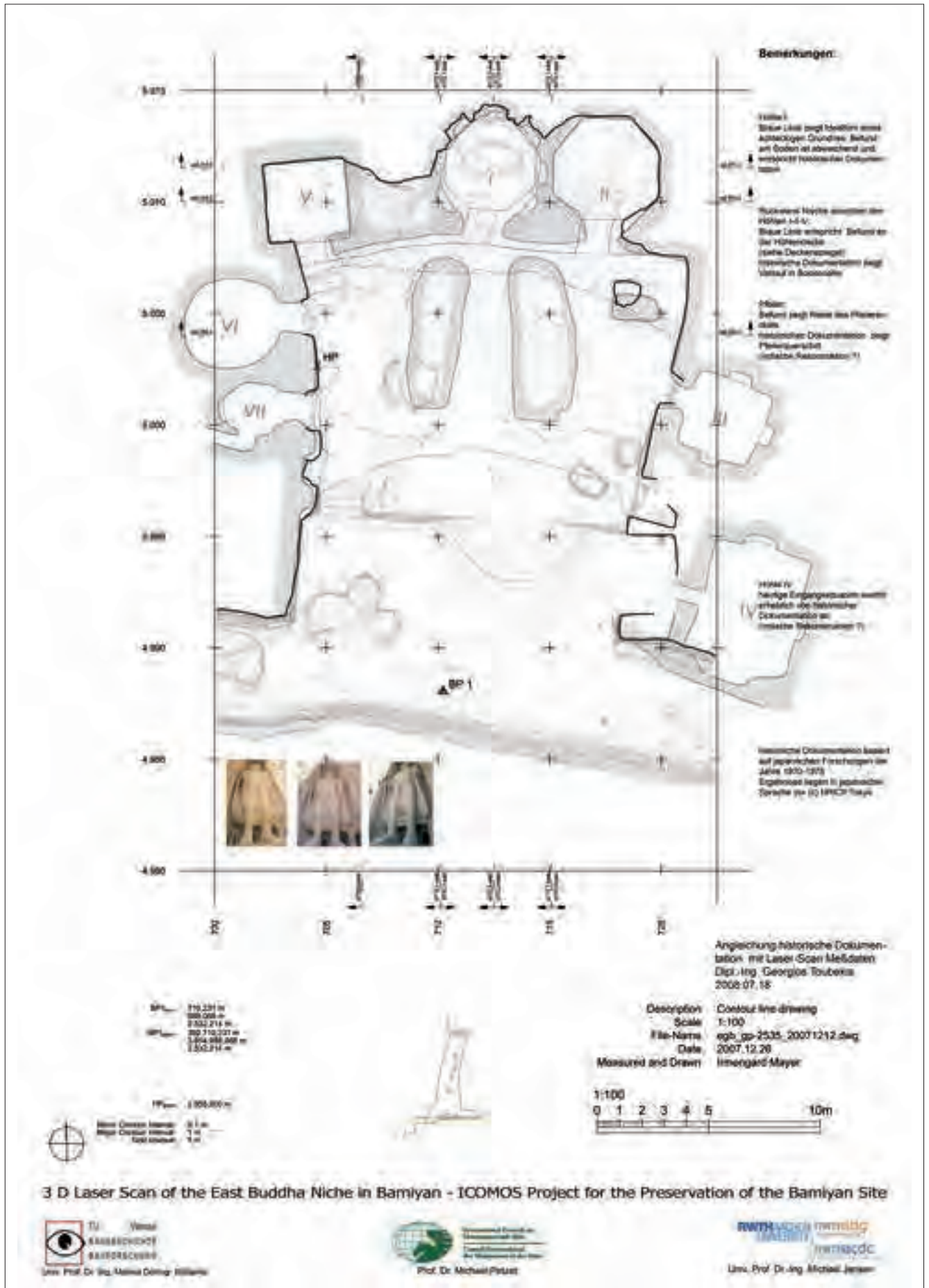
It was in the middle cave behind the feet of the Small Buddha (cave no. I) where the explosive charge was initiated (see fig. 6). Hereby the partition walls to caves no. V and II as well as the front wall of all three caves were completely blasted out. Thus caves no. V, I and II have a common ceiling now which is crossed by a new formed gaping vertical joint (see fig. 7). This joint parallel to the slope extends only partially into cave no. V and is feathering in the west wall of cave no. V. In the east wall of cave no. II it is still some centimetres open.

There are several smaller rock plates which could fall down from the ceiling of the three caves. These rock parts, which are on the verge of falling from the ceiling of caves no. V, I and II, have been temporarily supported with wooden props. A major function of the reconstruction of the parti-

Fig. 1. Buddha fragments KBF 001–016

Buddha Fragments															
Eastern Buddha - Small Buddha															
ID No.	Image location	Fragments	Stone	Height	Width	Depth	Type	Location	Surface area		Flattened size			Photo	Date
									m ²	cm ²	cm	cm	cm		
KBF001
KBF002
KBF003
KBF004
KBF005
KBF006
KBF007
KBF008
KBF009
KBF010
KBF011
KBF012
KBF013
KBF014
KBF015
KBF016

Fig. 2. Plan view of the Eastern Buddha niche with the location of the Buddha fragments KBF



tion walls is the stabilisation of the ceiling against local rock fall. Furthermore the reconstruction of the partition walls between caves no. V and I and caves no. I and II will guarantee an increase of the overall stability of the back wall of the Eastern Buddha niche.

To build the walls between the caves behind the ancient Buddha statue the smaller rock fragments, which were still in the niche and which did not show any treatment traces such as plaster remains or plaster holes, were used. Furthermore, fragments of approximately up to 0.1 m³ from a provisional deposit underneath the Buddha niche were transported upwards and also used to build the walls.

For the section of the partition walls between the three caves behind the ancient Buddha statue the site plan of the niche worked out by G. Toubekis was used, which is based on the 3D laser scan of the year 2006 (see pp. 117–121) and the historic documentation of Japanese research in the years 1970–1978 (see fig. 6).

The procedure when reconstructing the partition walls was as follows: The border margin of the walls was bricked up with quarry stones, afterwards the spaces between were filled with the fragments described above (see fig. 8). Thus the predominant part of the walls consists of fragments of siltstone and conglomerate.

Originally the walls of cave no. I had small niches which divided each wall of the cave and where statues were primarily standing. These niches have also been integrated into the reconstructed partition walls to approximate their original conformation. As a completion of the top of both partition walls a steel reinforced concrete beam was built where a connection to support further structural elements outwards is possible. At the same time it can fulfil the function of a compression strut if later a falsework for the fragments should be built, as I proposed in my report of 2006 (compare p. 109) After the hardening of the concrete beams the joint between beam and ceiling was filled with quarry stones and mortar, whereby all places at the ceiling are now protected against local rock fall. The supporting pillar under the eastern dress pleat, also blasted in 2001, has been reconstructed, too. Now it also supports a ledge that threatened to fall from the roof.

Upon completion of the partition walls they were plastered with a local loam mortar to adapt their appearance to the adjacent plaster of the undestroyed niche, a plaster used at the time of the restoration by ASI. This mortar for the partition walls was mixed in a hand barrow using predominantly loam with some water, straw chaff and burnt lime to get a smooth mash.

Documentation of fractures on the back wall

Due to the explosion in March 2001 rock sections which were partially loosened and are now on the verge of falling can be observed at the back wall of the niche of the Eastern Buddha.

Of the back wall of the niche a topographic record was made by a 3 D scan in October 2006. From this scan I. Mayer from Technical University Vienna and G. Toubekis from RWTH Aachen University created a front view rectified im-

age of the back wall on a scale of 1:50 in order to record the discontinuities and partially loosened blocks. Based on these records the RWTH Aachen Center of Documentation and Conservation made a comprehensive description of the back wall of the niche and its specific features (see figs. 9–14).

The procedure at this description becomes apparent in the summary (fig. 11), where you can see that the back wall is divided into stripes resulting from the floors of the scaffold. Each stripe is two meters high, as the distance of the floors. The documentation begins with the stripe between floor 3 and 4 in the lowest part of the back wall and ends with the stripe between floors 12 und 13 where the scaffold ends.

Stripe 3/4 between floor 3 and 4 is characterized by a large number of small joints with a length of 0.5 to 1.5 m. These joints are only some millimetres open, which indicates that no rock fragments will fall down.

Underneath the right hand of the Eastern Buddha a dress pleat partially in good condition continues downwards, which is slightly loosened from the back wall at the lower east edge by some joints parallel to the wall between floor 4 and 6 (stripe 4/5, field b, c and d as well stripe 5/6, field c). The joints are scarcely open and end under the pleat. I consider the danger of falling of this section to be rather low. Safeguarding measures are not to be taken here, at best a fissurometer can be installed to make sure that the joints do not increase. The plaster made of clay, still residually present at the east side over these stripes has been secured by Bert Praxenthaler.

Upside stripe 6/7 up to stripe 10/11 the number of joints diminishes considerably. In this section the back wall of the Eastern Buddha is in such a condition that it is not necessary to be secured. Only at the west and east side where there are still rests of plaster made of clay Mr Praxenthaler has secured them.

The right shoulder is affected in many parts due to several new formed joints parallel to the wall and loosened from the back wall (stripe 12/13, field b, c and d). Some joints are open. In my opinion the danger that some parts may fall down and the total section may follow is high. As soon as the scaffold in this section is finished safeguarding measures should be taken with fibre glass anchors.

The left shoulder is also affected in many parts due to several new formed joints parallel to the slope and loosened from the back wall (stripe 11/12, field f and g as well as stripe 12/13, field e, f and g). Some joints are open up to about 10 cm. In these open joints decimetre large rock pieces can be seen which have been fallen into the open joint from the upper side of the shoulder. Only a rock gusset of about 1.5 m² avoids the falling of the section. The rock gusset is also showing disintegration. In my opinion the danger that the whole part will fall is very high.

The back wall of the Eastern Buddha is still showing in its highest part remains of the head of the Buddha. This is a large rock plate which is affected in joints parallel to the slope. The joints are slightly open. The whole part must be secured. I am considering the danger of larger rock falls in the near future to be low. The scaffold is not yet finished up to the level of the head.

Fig. 3 . Buddha fragment KBF 001-016



△ KBF001 (DSCN 0646.jpg)



△ KBF001 (DSCN 0647.jpg)



△ KBF002 (DSCN 0648.jpg)



△ KBF003 (DSCN 0649.jpg)



△ KBF004 (DSCN 0650.jpg)



△ KBF005 (DSCN 0651.jpg)

▽ KBF006 (DSCN 0652.jpg)

▽ KBF006 (DSCN 0653.jpg)



Fig. 4. Buddha fragments KBF 007–013



△ KBF007 (DSCN 0654.jpg)



△ KBF008 (DSCN 0655.jpg)



△ KBF009 (DSCN 0656.jpg)



△ KBF010 (DSCN 0657.jpg)



△ KBF011 (DSCN 0658.jpg)

▽ KBF012 (DSCN 0660.jpg)



△ KBF012 (DSCN 0659.jpg)

▽ KBF013 (DSCN 0661.jpg)



Fig. 5. Buddha fragments KBF 013–016



△ KBF013 (DSCN 0662.jpg)



△ KBF013 (DSCN 0663.jpg)



△ KBF014 (DSCN 0664.jpg)



△ KBF014 (DSCN 0665.jpg)



△ KBF015 (DSCN 0666.jpg)



△ KBF015 (DSCN 0667.jpg)

▽ KBF016 (DSCN 0668.jpg)

▽ KBF016 (DSCN 0669.jpg)



Conclusions

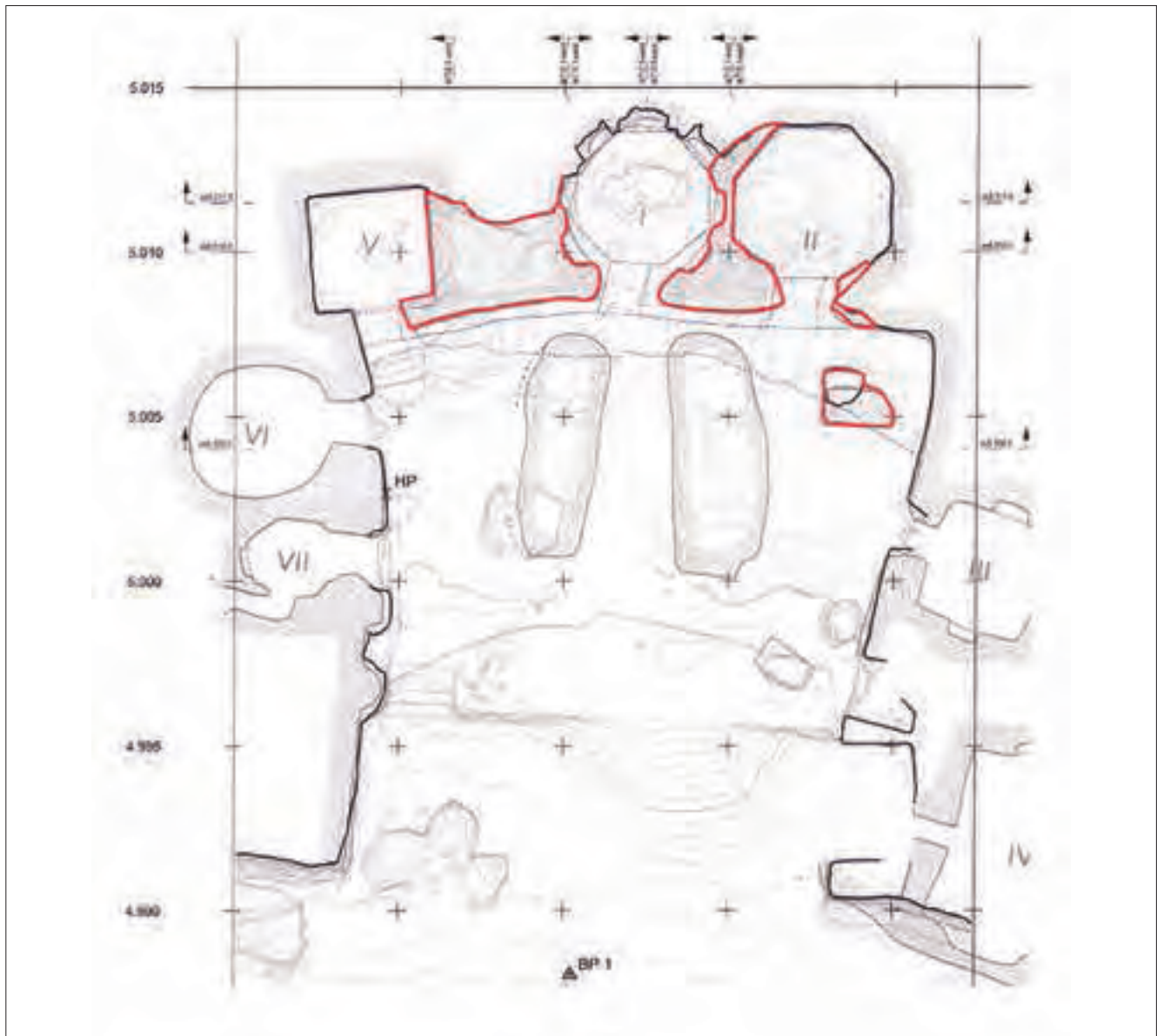
By completion of the partition walls the caves no. V, I and II can be entered without risk. Furthermore the reconstruction will guarantee an increase of the overall stability of the back wall of the Eastern Buddha niche.

As a permanent support of the loose rock formations at the left and right shoulder a fastening by anchors is necessary. As soon as the scaffold is finished and the shoulders will be accessible the works should start.

References

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Fig. 6. Plan view of the Eastern Buddha niche with the contours of the destroyed caves and of the reconstructed partition walls





Figs. 7a, b, c. Destroyed caves at the base of the Eastern Buddha niche





Figs. 8a,b. Reconstruction of the partition wall between caverns no. I and II



Fig. 9. Eastern Buddha niche, damage assessment of the back wall



Fig. 10. Eastern Buddha niche, 3D laser scan, showing idealized reconstruction (blue line), original statue surface (green), back wall discontinuities (red)

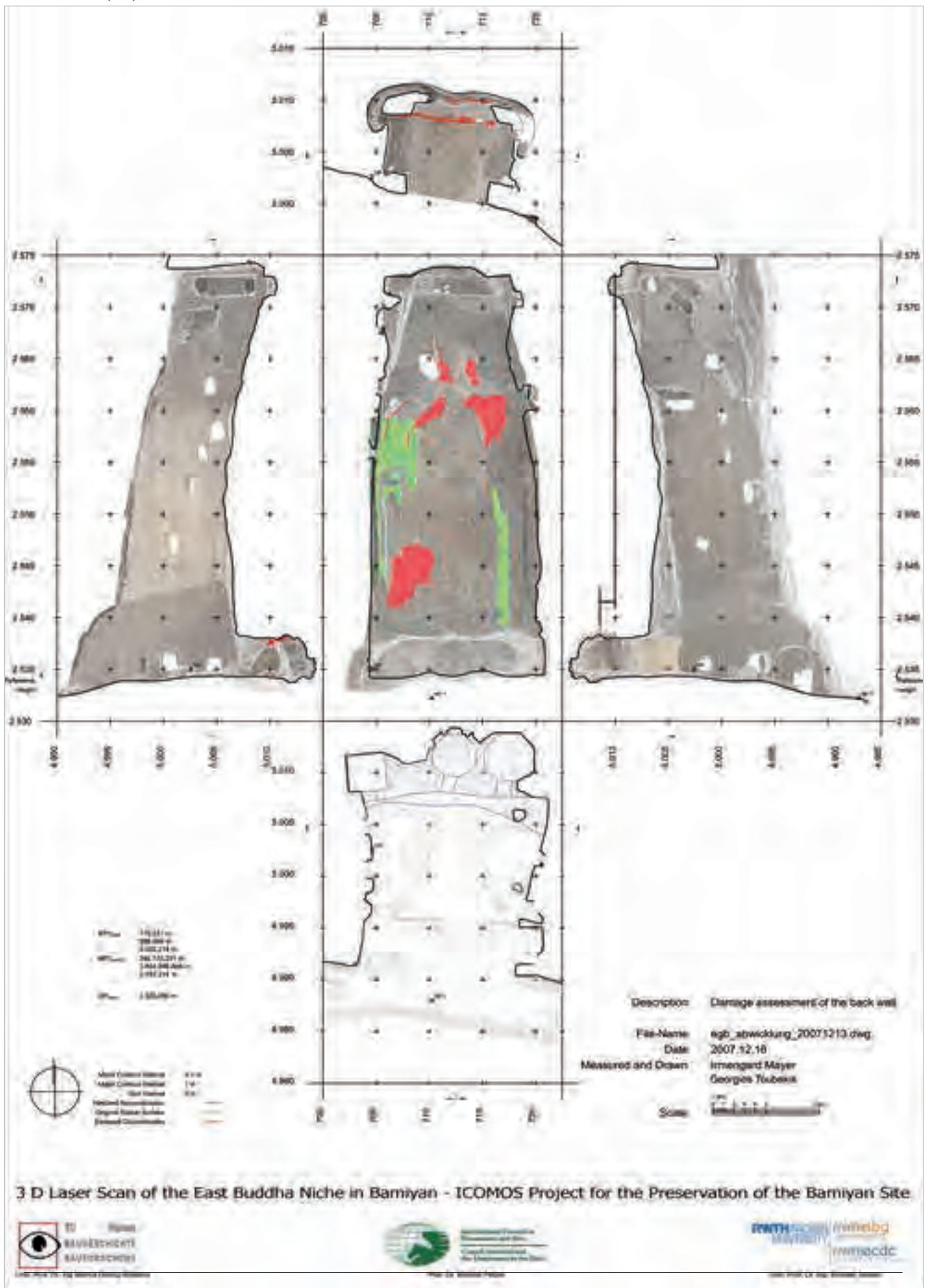
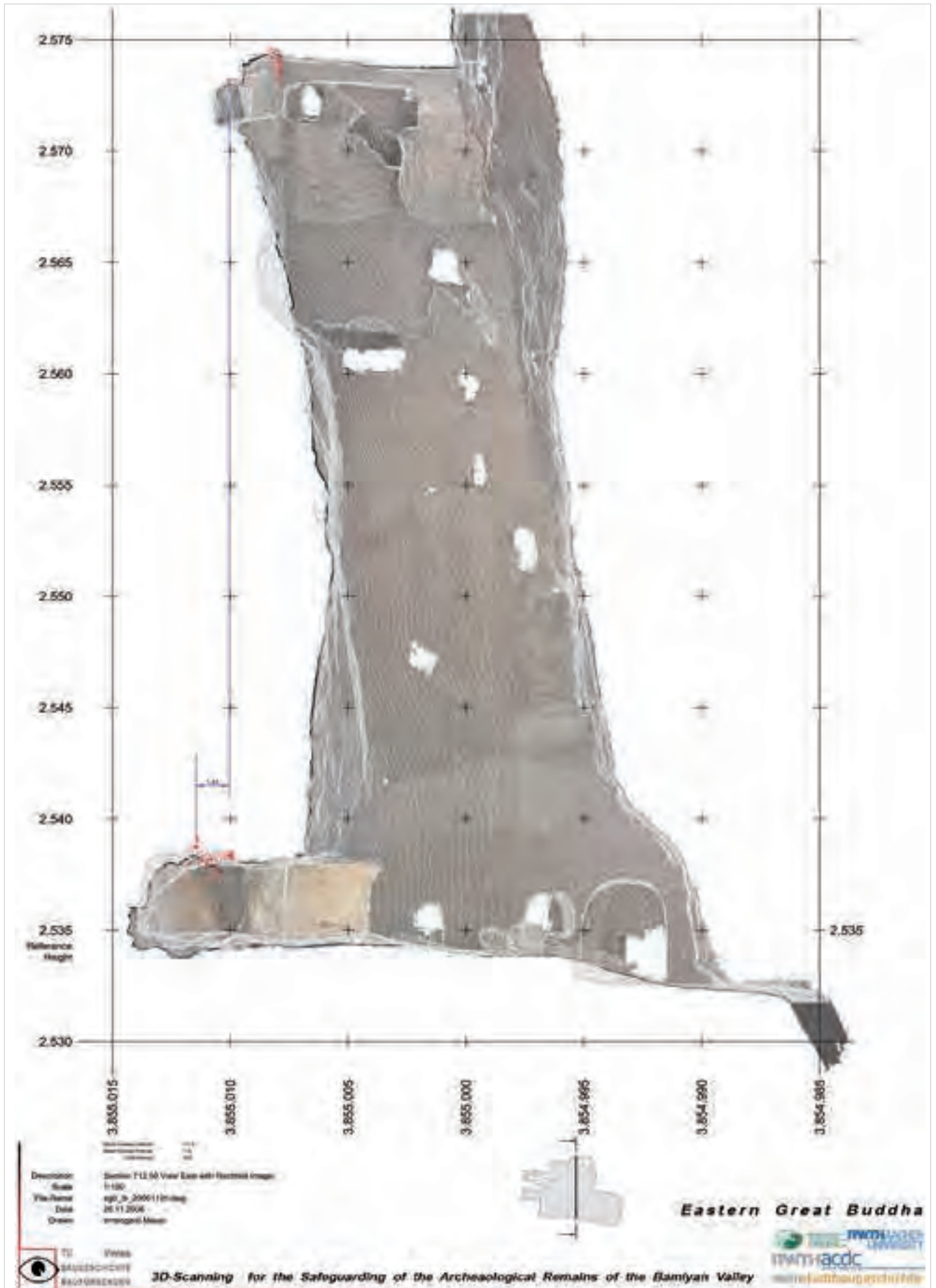


Fig. 11. 3D scanning, view east, with rectified image



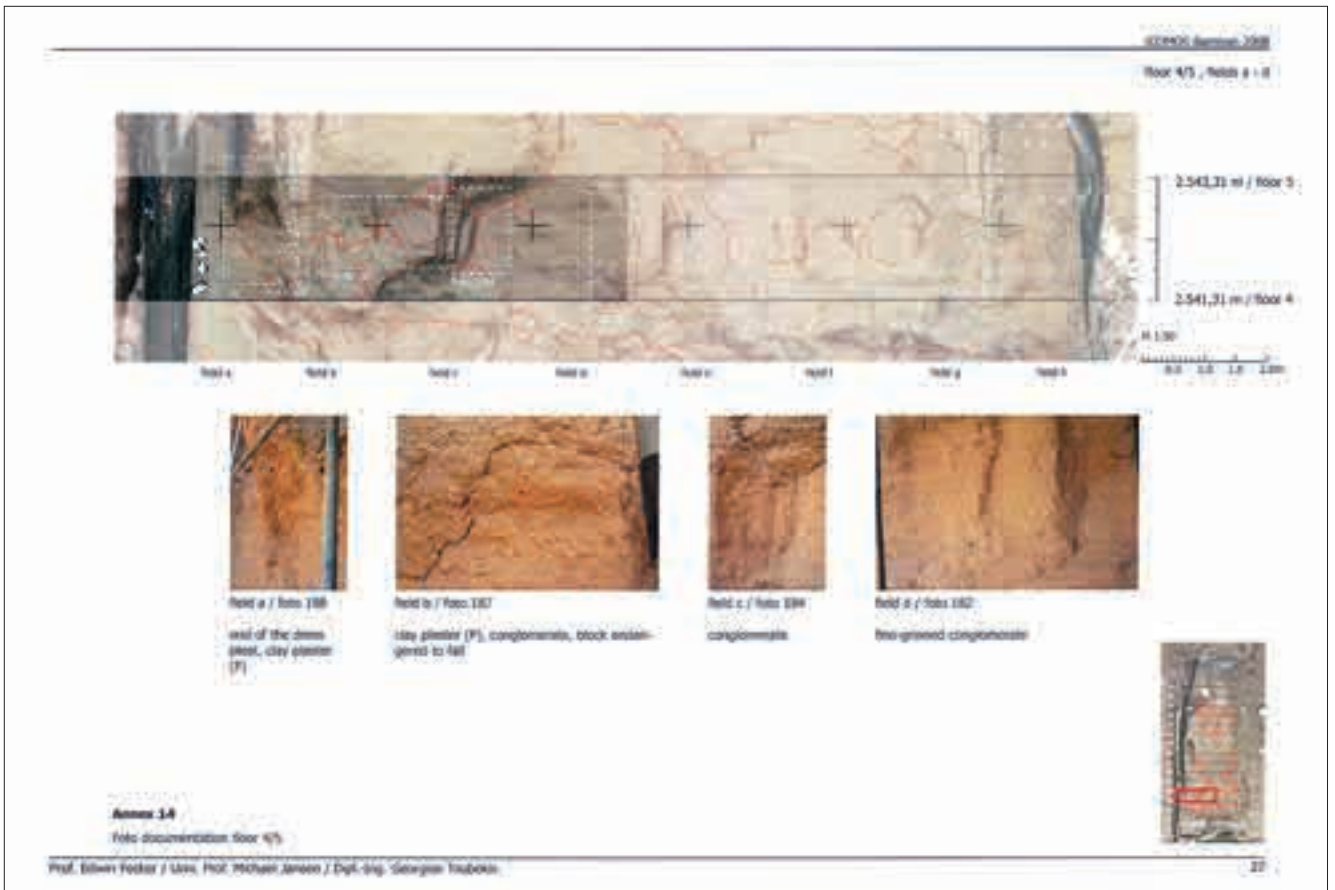


Fig. 13. Eastern Buddha, damage assessment, photo documentation, floor 4/5

Fig. 14. Eastern Buddha, damage assessment, photo documentation, floor 9/10

