

**Güllüdere  
and Kızılçukur:**  
the Rose Valley  
and the Red Valley  
in Cappadocia

International Carlo Scarpa  
Prize for Gardens 2020–2021

31st edition

edited by  
Patrizia Boschiero and Luigi Latini

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section **The study and care of the place**, contributions by  
Maria Andaloro, Paola Pogliani, Michele Benucci e Giuseppe Romagnoli,  
Carmela Crescenzi, Giorgio Verdiani,  
pp. 142-186 and 187-191 (sectional bibliography)

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**Güllüdere and Kızılçukur: the Rose Valley  
and the Red Valley in Cappadocia**

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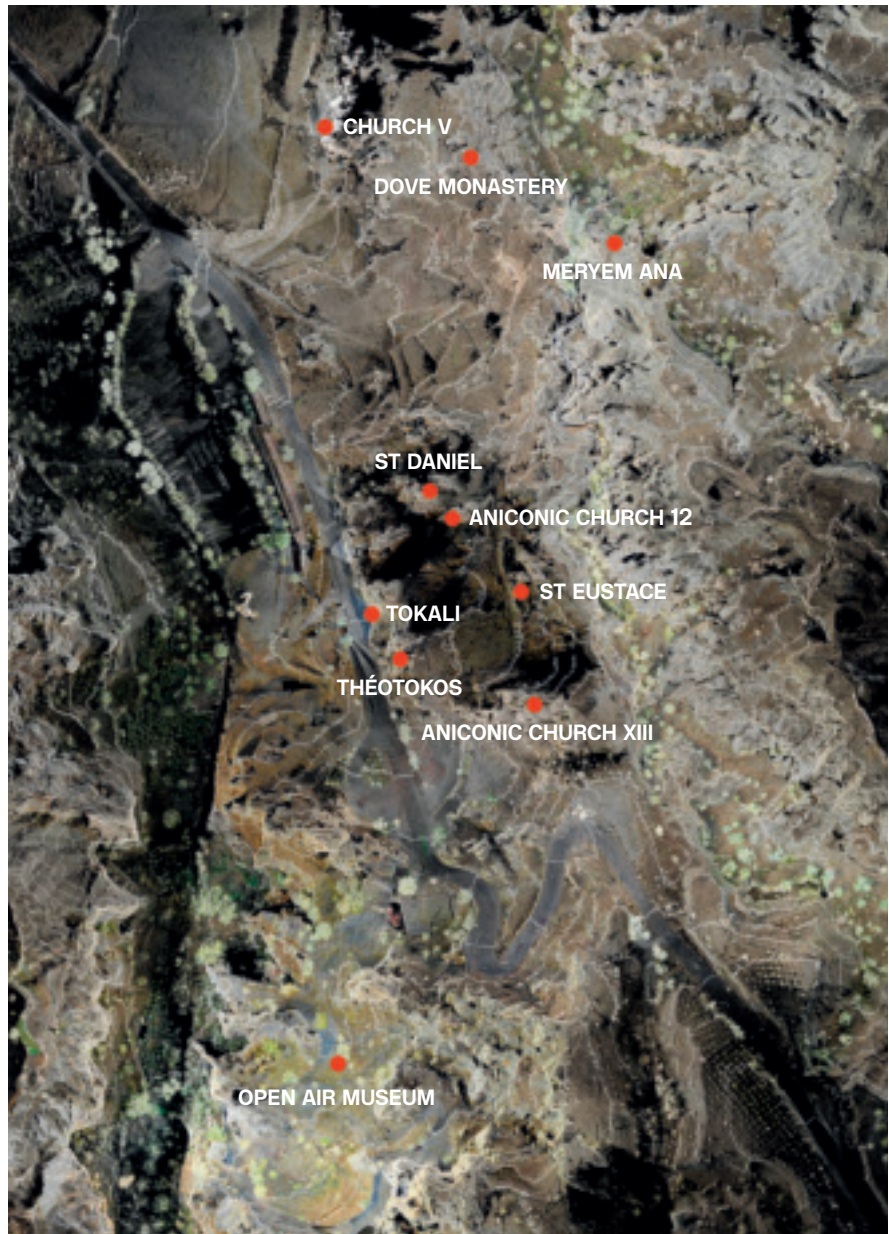
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iconographic and documentary materials.

1. Map, drawn in cyclone 9, of the landscape survey, approximately 1,000 x 500 metres, drawn up with contour lines. The area extends from the Church v and Dove Monastery complex to the Open Air Museum, Göreme. The environmental survey was taken from the Göreme valley to the Kılıçlar valley. The documentation of digital data was acquired using a Riegl VZ 400 scanner. Going from north to south, the architectural units surveyed are: Church v, the Dove Monastery, the complex of Meryem Ana, St Daniel, the aniconic Church 12, St Eustace, the aniconic Church XIII and, lastly, the Open Air Museum.



CARMELA CRESCENZI  
**Survey of landscape surrounded  
 by the Göreme and Kılıçlar valleys**

**A naturalized urban landscape**  
 The research unit from the Department of Architecture of the University of Florence<sup>1</sup> has focused its studies on the

digital documentation of the rock-cut heritage of the Cappadocian habitat in the area adjoining the Göreme Open Air Museum (Açık Hava Müzesi). The empathy of the landscape<sup>2</sup> results not from a clichéd romanticism but from this natural artistic setting, the symbiotic result of the sculptural properties of the volcanic rocks, of human skills, and of a slow



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and inexorable process of erosion, which have combined to create this marvellous naturalized landscape over thousands of years.

This landscape reveals living spaces or realities carefully concealed in the interior of the rock that are occasionally exposed through rock falls caused by imprudent use and by natural processes.

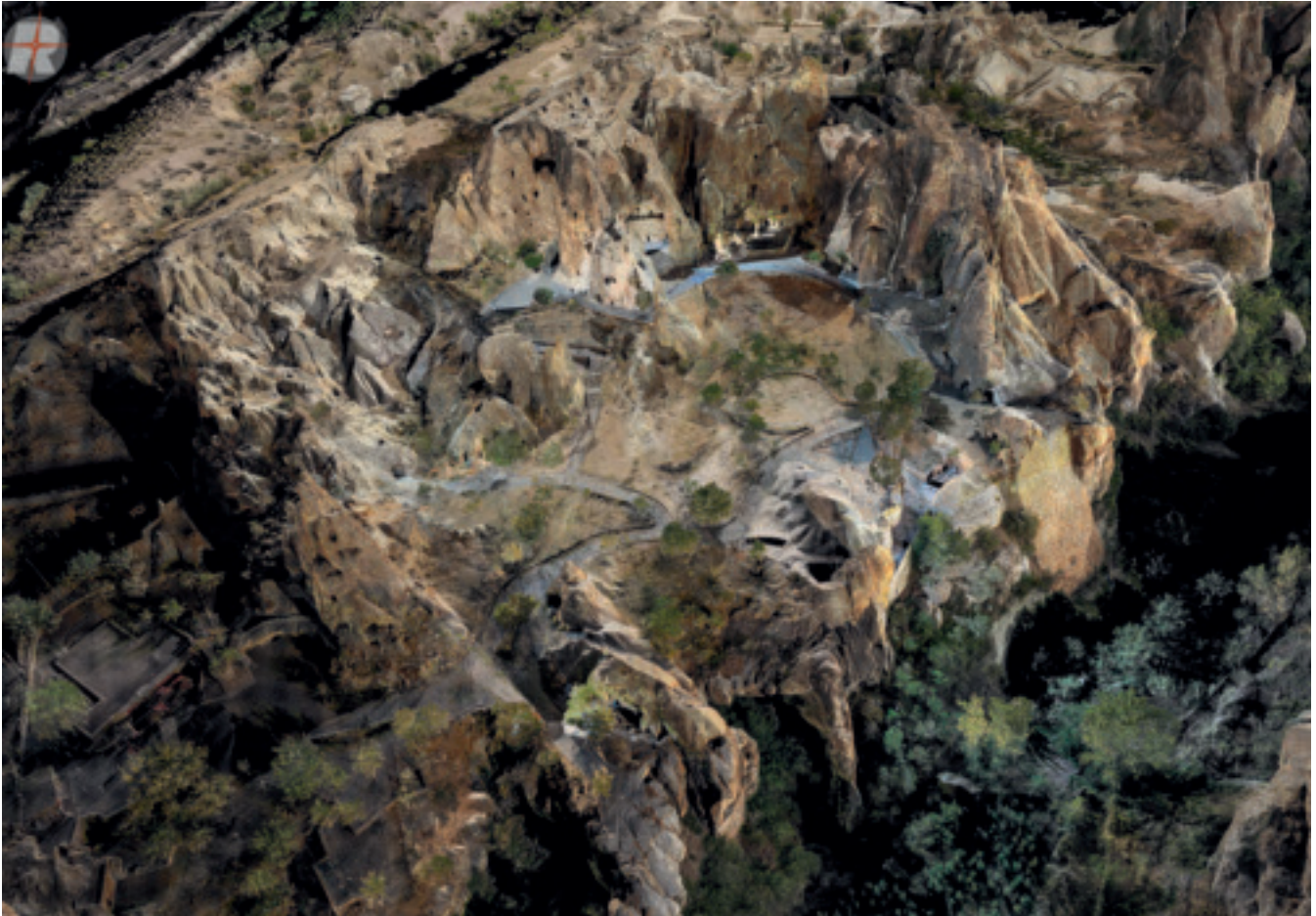
### **The survey area**

Expeditions and surveys carried out in Cappadocia at the beginning of the last century began by documenting religious buildings, especially those with wall paintings or with particular architectural features, furnishings or sculptural decorations or buildings with stone tables. It was not until the end of the

2-3. Views of the pinnacle of Meryem Ana and of the Valley of Swords (Kılıçlar Vadisi). These environmental documentations as well as the surveys in figs 4-6 were carried out using a Riegl VZ400 laser scanner.

1. The research unit from the Department of Architecture of the University of Florence (UR UNIFI-DIDA) is made up of Carmela Crescenzi coordinator, Marcello Scalzo, Francesco Tioli, Giorgio Verdiani; as well as Claudio Giustiniani, Andrea Leonardi, Sofia Menconero, Andrea Pasquali, Tiziana Pignatale, Gianluca Tarabella. Researchers from the Centro Studi Sotterranei, Genoa: Andrea Bixio, Roberto Bixio, Andrea De Pascale.

2. "Certain places. Their beauty. We are there and we observe them. Before us, the motion of the waves and the clouds, a spectacle of forms, lights, and colours put on by nature, a spectacle that absorbs the profundity of the place, consuming it. Actually, we are not merely observing: we are caught up in that spectacle emotionally and with the excited universe of senses. We suddenly realize that all the elements are taking part in a splendid cosmic dance. We cross the threshold of observation to venture into a watching that opens the path to sudden discovery. The rock, the water, and the sand break down and dissolve into a rain of energy, into a dust of colour tones" (MILANI 2005, p. 13). For the complete bibliography cited in abbreviated form in this and in the following footnotes, see, here, on pp. 187-191.



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4. View of the exedra of the Open Air Museum, Göreme.

3. CRESCENZI 2014.

4. Two types of laser scanner were used to carry out the surveys: a Riegl VZ 400, which is a time-of-flight or TOF system, while the Faro

20th century that the value of rock-cut settlements was recognized and the first studies were undertaken into network systems and their development in the landscape.

The environmental survey area, which is about a kilometre long and 500 metres wide, comprises the Göreme and Kılıçlar valleys and the promontory lying between them. In the latter area, the environmental survey was integrated with architectural documentation of most of the settlement system. The aggregation of the two survey scales transforms this spectacular landscape resembling giant termite mounds into a peerless configuration of artefact-natural setting. Two main types of settlement are featured in the documentation drawn up: the 'linear' settlement running

along the ridge of the Valley of Swords (Kılıçlar Vadisi) and the 'islands' built in the pinnacles. However, it should be pointed out that the survey only explored the most accessible and visible part of this vast settlement, the equivalent of the tip of this rocky iceberg. Detritus and rock falls conceal and preserve several unexplored levels in these structures. The isolated, accessible nuclei that survived were probably originally part of a single subterranean city with an infrastructure serving and protecting the settlement and the family groups living there.

#### **The digital survey**

The studies carried out by the DIDA researchers are based on a digital survey using three-dimensional photogrammetry



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and LIDAR (Light Detection and Ranging) technique suited to documenting the natural rocky structure of the chosen context.<sup>3</sup>

The surveys, carried out between 2012 to 2014, involved the use of three main 3D laser scanners, a Faro Focus Cam/2, a Z+F 5006h and a Riegl VZ 400 long range unit.

Merging the 270 environmental scans, along with the thousands of architectural scans, into a single model involved painstaking post-processing work to align and aggregate data.

The vast area covered, the environmental conditions, and morphology of the rock walls sometimes made it necessary to use natural rather than mobile markers. The correct continuity of space was ensured by superimposing the survey

areas. Integrated models, divided by settlement unit, were drawn up with the help of specific target systems linked to natural points.

The rock surfaces ensured good reflectivity and therefore accuracy of the phase shift measurement method (ZF, Faro),<sup>4</sup> giving access to data even at considerable operating distances.

However, for the purposes of alignment, it was decided to use points close to the scanner and generally located in clearly legible areas.

The aim was to avoid mismatch phenomena by creating an aligned point cloud and making it possible to obtain the vision of an organic, detailed space for the description of landscape and architecture.

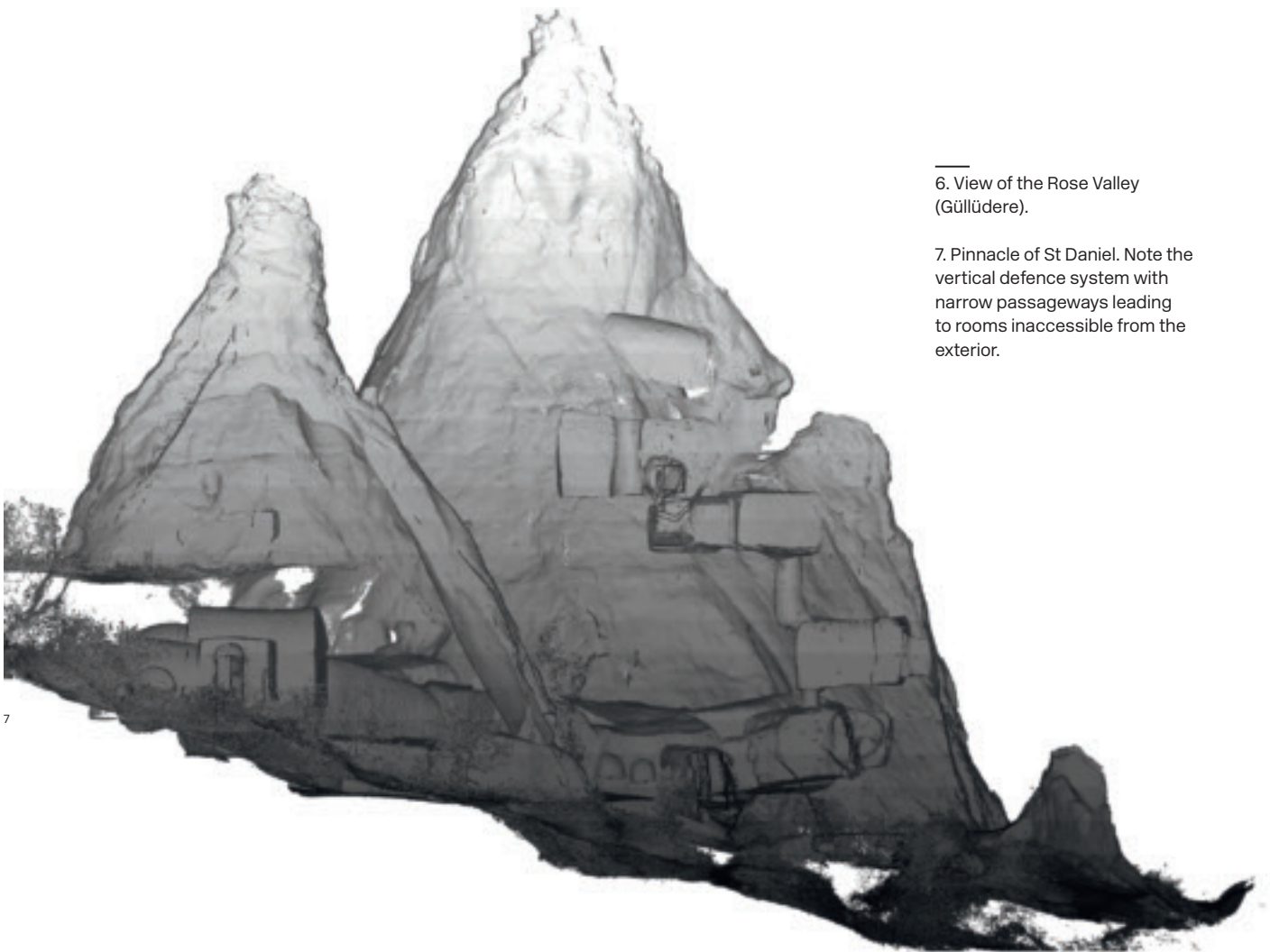
The complexity and extension of

5. View of the Göreme valley and of the exedra of Open Air Museum.

Focus Cam/2 and Z+F5006h are phase based. TOF laser technology allows you to generate a point cloud by calculating the time it takes for the laser to travel the distance from the sensor to the object and back, where the speed of propagation of the laser beam is equal to that of light. These laser scanners are distinguished by their capacity to survey extremely distant data, even up to a range of 6 kilometres. When using phase-based scanners, the distance is calculated by comparing the phase difference between the transmitted and received beam. These laser scanners stand out for their extremely rapid acquisition times and the high density of data acquired, which can go up to 0.6 millimetres between points at distances up to 10 metres.



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6. View of the Rose Valley (Güllüdere).

7. Pinnacle of St Daniel. Note the vertical defence system with narrow passageways leading to rooms inaccessible from the exterior.

the survey area made it necessary to divide it by thematic area with reference to the architectural features that have already been classified as well as those emerging from the survey.

The high number of scans necessary to document the complex architecture of the units made it necessary to further divide them into subordinate parts.

The survey reveals an underground urban structure comparable to the city built overground with civil and religious service infrastructures. It includes an aqueduct running along the Valley of Swords, while on the plateau there is a water collection and distribution system that is still functioning. There are two large churches in the area – the majestic Tokalı and the aniconic Church V – in addition to parish or village churches as well as numerous chapels (both funerary and non-funerary) of varying sizes that probably belonged to family buildings. The defensive character of these complexes responded

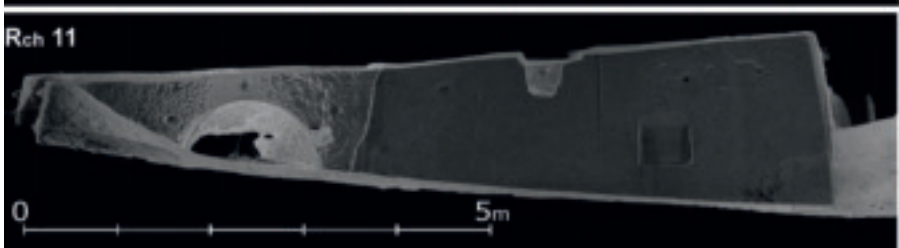
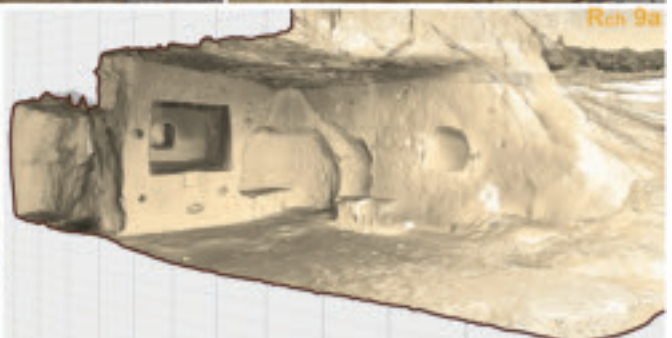
to the need to protect individual families or clans or even entire communities.<sup>5</sup> Some pinnacles, like those forming the complex of St Daniel, contain vertical defensive systems with small rooms that could have been designed to ward off short raids by small groups or bands of attackers. Whereas the complex of St Eustace<sup>6</sup> and Meryem Ana overlooking the Valley of Swords seems to use a horizontally distributed defensive structure; there are narrow galleries and millstone doors protecting a number of large rooms that could hold larger numbers of people for long periods. Most of these systems overlooking the steep side of the valley are now in ruins. The survey area has a high concentration of refectories, one or more rooms with stone tables used by different units.<sup>7</sup> Initially identified by scholars as Byzantine monasteries, today it is thought that such buildings were used as reception structures for

5. BIXIO 2012.

6. ANDALORO-BIXIO-CRESCENZI 2013.

7. CRESCENZI 2020.



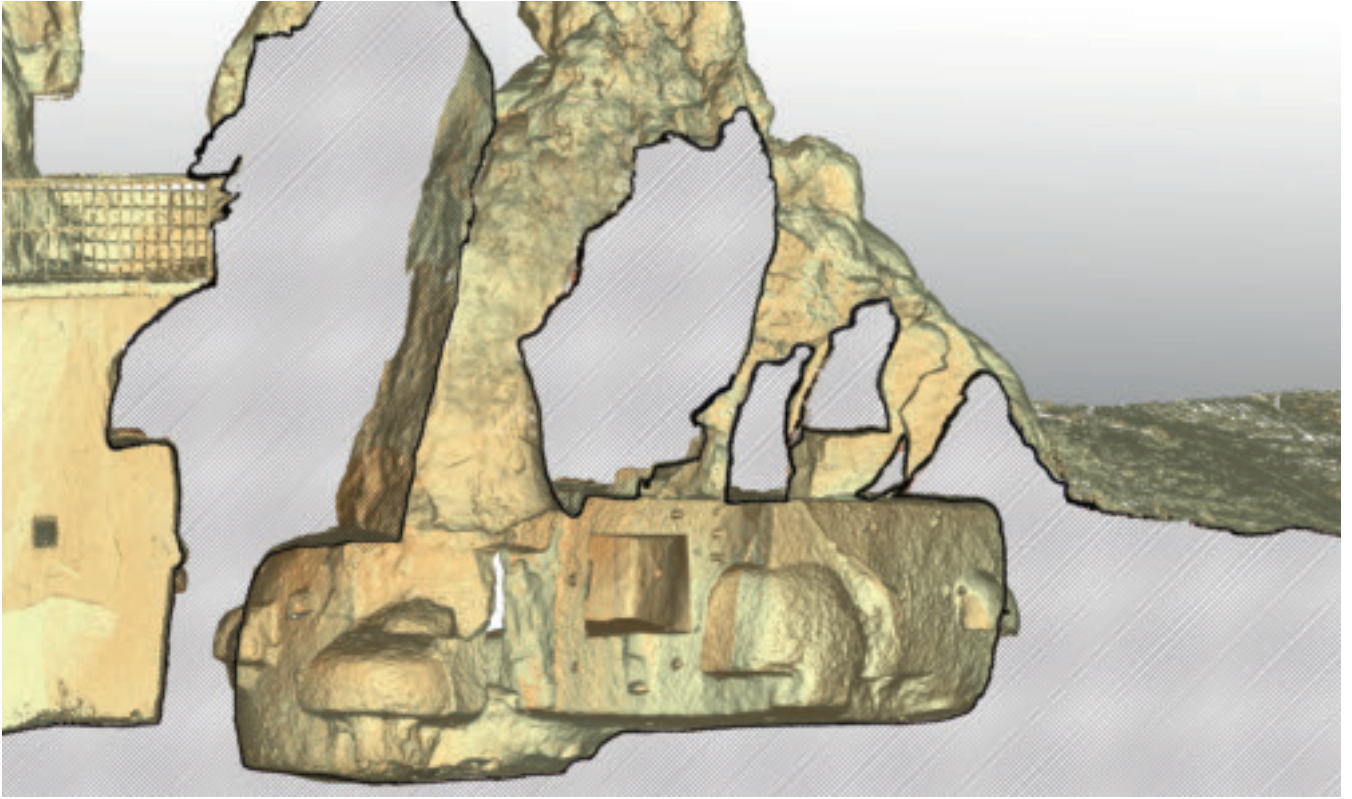


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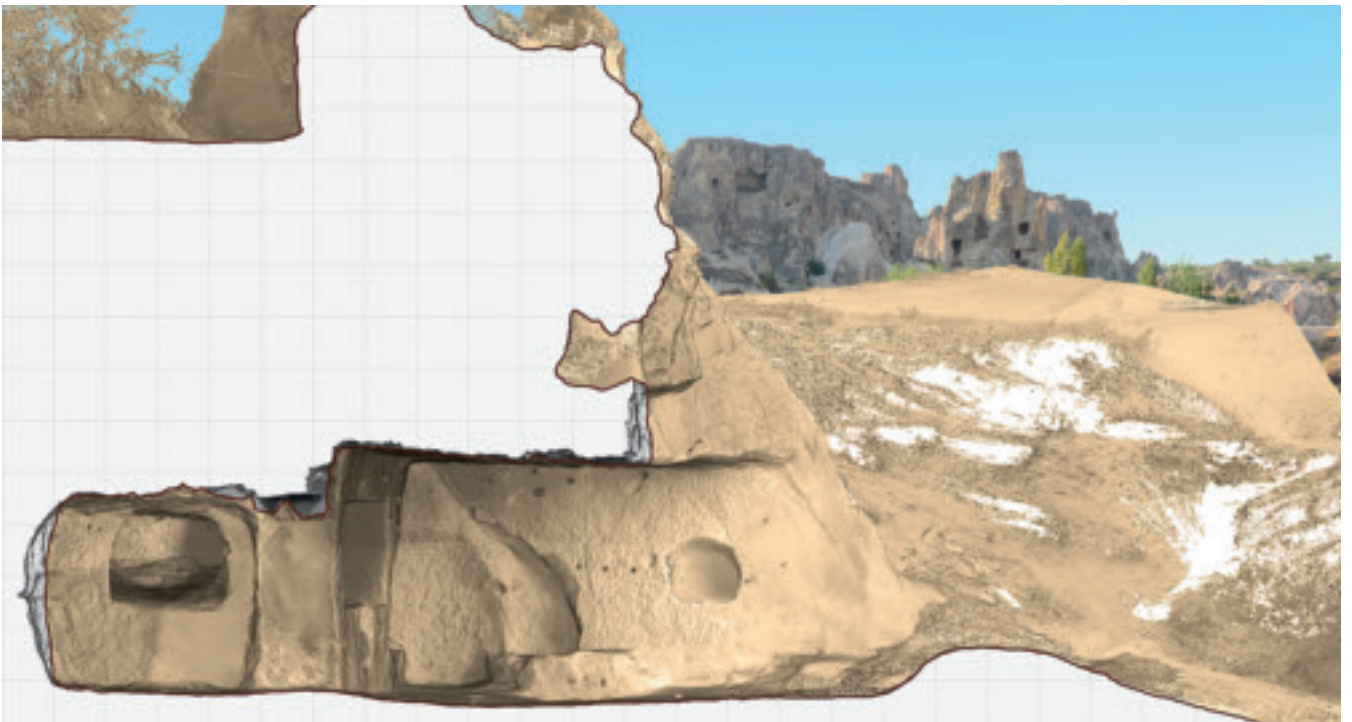
8. Refectories on the plateau between the Göreme and Kılıçlar valleys.

9. View of the room with fireplace and of the refectory below the chapel of the Théotokos (9).

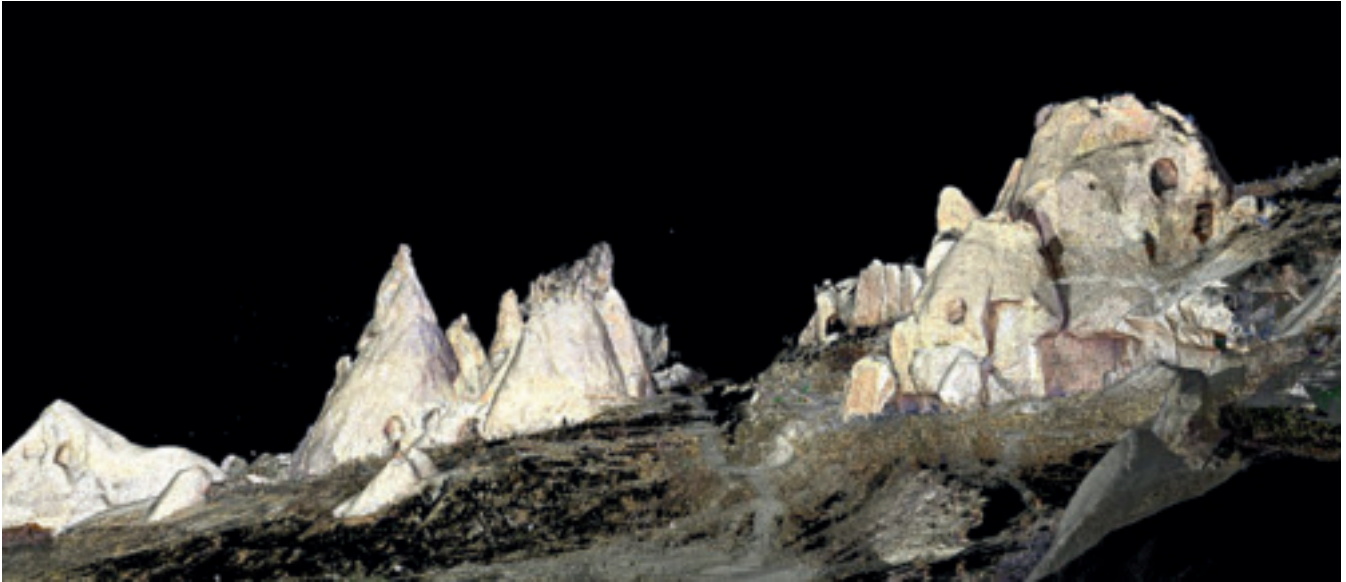
10. Cross-section of refectory below the chapel of the Théotokos (9).



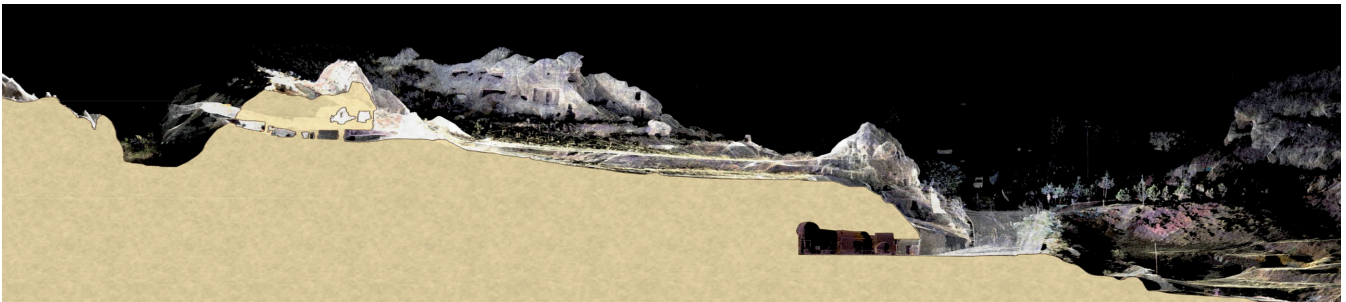
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11. Southern side of St Daniel complex, on left, and St Eustace complex, on right.

12. Cross section running from north-east to south-west of the closed slope of the Kiliçlar and Göreme valleys.

guests at secular and civil events,<sup>8</sup> like the commemoration of the dead.<sup>9</sup> The refectories may have been designed to respond to the multiple needs of a polyvalent space, as dining halls, for leisure events and business dealings, in a similar way to the Islamic *Qa'a*.

Although in some cases the cultural unity of the settlements in this area has been damaged or destroyed, we can still find vital evidence of these rock-cut building environments. Despite the deterioration, rock falls and erosion caused by weather, the value of this place in both archaeological terms and as an open-air ecomuseum should not be understated.

The digital model provides an 'objective' interpretation of the landscape along with concrete territorial

and environmental information. The morphological and physical description of the territory provides a good basis for contextualizing metric and quantitative data as well as historical, urban-planning, and economic character. The geographical location of the interdisciplinary results produced by the research groups facilitates new relations between data, swift testing of existing hypotheses, and sharing of multidisciplinary data flows. Therefore, the model is a critical instrument for the representation, management, and planning of the landscape.

8. TURKER 2011, GÜL ÖZTÜRK 2012.

9. OUSTERHOUT 2010.