Gelati Monastery Complex

The Church of the Nativity of the Virgin Mary

The North-East Chapel

Summary of the Survey of the Wall Paintings

2024

Stakeholder: Gelati Rehabilitation Temporary Committee

Summary

Context

The North entrance and North-East chapel of the Church of the Nativity of the Virgin Mary were built in the first half of the 13th century. The North-East Chapel of the Saviors was painted under the commission of King George III of Imereti (1604–1639) and served as his ancestral crypt. The painting is linked to a wider group of 17th-century painting at Gelati Cathedral, which is distinguished by its high quality of execution. An earlier scheme also partially survives, but as this is now mainly limited to bare plaster and very little paintwork remains, it is difficult to date. Aspects of its plaster composition resemble the earliest painted scheme (probably 12th – 13th century) found in the South-West Chapel of the Church of the Virgin Mary. Additionally, signs of historical repairs and restorations are evident, including plastering and decorative painting imitating the 17th-century style.

Physical and Conservation histories

The earliest recorded conservation interventions here began in the 20th century, possibly treatments made in the 1950s by Shalva Abramishvili and Karlo Bakuradze. Further work was carried out in 1980-81 under A. Goglidze. In 2003-06, a diagnostic study was conducted, followed by a further assessment in 2008 by Ms. N. Kuprashvili.

In 2017, the stone facade was conserved. In 2019, the chapel's tin roof was replaced with glazed ceramic tiles, and in 2020, a temporary roof and gutter system were installed to prevent water ingress. Ongoing monitoring of the facade and interior paintings has been conducted since summer 2020. Also in 2020, an assessment of the chapel's physical history and condition was carried out by the E. Privalova Technical Research Center for Painting "Betnia."

Between 2017 and 2024, deterioration of paintings (paint and plaster loss, bioactivity, salt efflorescence) and risk of further damage was observed, prompting emergency stabilization in March 2024. Starting in June 2024, the chapel's documentation and salt studies began. Since September 2024, the chapel has been incorporated under a secondary temporary roofing structure, which will stay in place for the duration of the current conservation project.

Original technology

Painting scheme 1: Earlier Layer (undated)
The lowest and earliest scheme is visible only in few places. The unpainted plaster only remains at dado level in the apse, whereas in the eastern part of the chapel, on the northern side, some painting also still survives. The lime-based plastering is technologically distinct from the later superimposed painting scheme, featuring only a coarse-grained sand filler. Where painting survives on the early scheme, it includes a decorative vertical red stripe indicating a scene division, and some traces of black, white, yellow, and red colour.

Painting scheme 2: Main paintings (17th Century)
This scheme extends over almost the entire chapel. It is applied on a single lime-based plaster of varying thickness, containing straw-like and transparent fibrous organic inclusions (the former can be up to several cms in size). In some areas, substantial charcoal inclusions are also present. The plaster matches that of the 17th-century painting schemes in the main space of the church (plaster type 3) and in the North-west chapel (Painting scheme 2). The plaster is applied homogeneously, and plaster joins follow the original scaffolding levels and scene divisions. Preparatory techniques include geometric setting out and preliminary drawing, using incised and snapped lines, compasses, freehand incisions and painting.

The palette consists of red, yellow, green, blue, black, and white, with gradations achieved through layering or mixing. A range of red pigments appears to be present, along with two types yellow and blue. Blue is applied over black or white backgrounds. Green and black pigments seem to be single types.

Faces and hands of the figures are modelled and built up in layers: a light brown base of earth pigments, the main shapes filled in with pink and red colours, skin tones with pale yellow, and highlights added in white pigment.

Condition of the paintings

The overall condition of the wall paintings is satisfactory and currently relatively stable compared with other parts of the church. However, there are concerns relating to the presence and activity of salts, especially as the salt content includes nitrates[1], which as easily soluble ions readily undergo phase changes in response to the chapel's climatic conditions.

[1] Only soluble ion testing has been caried out, and analysis of salt species is in process.

Painting scheme 1: Earlier Layer (undated)

This scheme exhibits severe plaster deterioration, including decohesion, cracking, and salt efflorescence.

Painting scheme 2: Main paintings (17th Century)

Plaster: combined problems in the plaster include delamination, decohesion and pitting (from loss of organic inclusions), which are prominent in the lower parts of the chapel. Although some delaminated plasters were stabilized in March 2024, some small areas remain at risk, particularly on the north and east walls. Additionally, concealed delamination are present in the upper registers, near the vault.

Painting: there is quite extensive paint flaking, especially on the faces and hands of the figures. Processes of paint failure relate both to inherent features of the paint materials and to climate conditions. Environmental degradation of pigments is also evident, including specific darkening of metal-containing pigments, and 'fading' or 'bleaching/whitening' of other pigments, manifesting as partial or complete loss of colour. These processes have dramatically altered the visual appearance of most figures and backgrounds in the chapel.

Other conditions include damage from rainwater infiltration and considerable graffiti (the latter especially present in the north window, where hand images and circular geometric shapes have been made).

Environmental conditions

The primary factor influencing the microclimate of the North-East Chapel is the macroclimate, as interior trends largely mirror exterior conditions. On the interior, absolute humidity (AH) levels in 2024 ranged between **2 and 23.5 g/m^3**. The trends of absolute and relative humidity are generally aligned: both increase during periods of atmospheric precipitation and decrease in dry weather. This pattern confirms that the exterior environment is the primary source of moisture.

However, in summer, higher interior AH levels compared to exterior levels—particularly on days with little or no rainfall—may indicate the presence of an additional moisture source, such as **groundwater or an underlying spring channel**.

In contrast to the chapel's weak hygral buffering, its thermal behaviour exhibits a moderate buffering function. The fabric features that allow or filter these climate conditions include two windows with wooden shutters, which allow air movement, and one opening in the west wall, which communicates with the North entrance.

In 2024, relative humidity (RH) showed notable seasonal and monthly fluctuations:

- Winter and Autumn: High RH (≥70%) occurs infrequently, for about 11% and 17% of each season, respectively. In autumn, minimal RH, 21%; maximum RH, 84%. In winter, minimal RH, 31%; maximum RH, 95%.

- Spring: High RH is recorded for half the season. Minimal RH, 30%; maximum RH, above 95%.
- Summer: High RH increases significantly, about 88% of the season. Minimal RH, 36%; maximum RH, above 95%.

RH levels below 40% were detected on very few occasions in the spring, autumn, and winter seasons (about 6% of the time), while in summer, they did not drop below this threshold at all.

According to the 2024 data, annual temperatures on the exterior range from -3.95°C to 39.05°C. On the interior of the Chapel, recorded temperatures vary between 4.14°C and 28.1°C. Interior fluctuations are primarily limited to daily changes of up to 2°C and monthly changes of 5-9°C, although in April of this year a11.74°C difference occurred.

The influence of these environmental conditions on deterioration of the wall paintings is significant, especially in promoting cycles of damaging salt deliquescence-crystallization. Condition monitoring conducted in 2020–2021 recorded substantial salt activity (type: fluffy flakes). Monitoring at dado level on the north wall begun in December 2023 revealed new efflorescence of nitrate-containing salts on 28th of June 2024, when RH levels were recorded between 42% to 75%. Since this date, no further salt activity has not been detected, despite considerable RH fluctuations. To improve monitoring accuracy, 3D photogrammetric monitoring is planned.

Remedial interventions

Condition monitoring and assessment identified risk of plaster loss at dado level on the north wall from impact damage. In March 2024, stabilization interventions were carried out, including lime-based injection grouting and edge repairs. Conditions have since remained unchanged in the treated area. In December 2024, salts were mechanically reduced as part of a combined treatment/ monitoring procedure. Remedial treatment of remaining risk conditions is planned.

List of Georgian documentation:

Survey of wall painting technology and condition at the North-East Chapel of the Church of the Virgin Mary in Georgian
Painting schemes of the North-East Chapel of the Church of the Virgin Mary in both languages
Graphic Documentation of the condition of the wall paintings and plaster joins in both languages
Environmental Monitoring Report for Northen buildings 2024 in Georgian and partly in English
Gelati, Church of Virgin, Envrionmental Monitoring report 2023 in English
Gelati, Church of Virgin, Envrionmental Monitoring report 2020-2022 in English
Gelati, Church of Virgin, Envrionmental Monitoring report 2021_September in English