`Gelati Monastery Complex

The Church of the Nativity of the Virgin Mary

The North-West Chapel

Summary of the Survey of the Wall Paintings

2024

Stakeholder: Gelati Rehabilitation Temporary Committee

Summary

Context

The North-West chapel of the Church of the Nativity of the Virgin Mary was built later in the 13th century, after North entrance and North-East chapels were constructed. The north-west chapel preserves two schemes of painting, evidencing the cultural and artistic evolution of the site. The earlier layer, preserved in small fragments, dates to the 13th century and represents medieval artistic traditions. The later layer, dated to the 17th century, was commissioned during the episcopate of Zakaria Kvariani (1639–1657), whose portrait is depicted on the north wall of the chapel. Additionally, the altar features an image of St. Nino, underscoring the chapel's religious and historical significance. The paintings provide valuable insights into the stylistic and thematic transitions across centuries at Gelati.

Physical history

The chapel has been the focus of several conservation efforts. The wall paintings were conserved in 1980–81 by a Georgian team. Visible interventions include fillings and edge repairs, which were colour toned, while less noticeable actions, documented in reports, include salt removal, paint consolidation, and cleaning. Diagnostic studies and assessments were carried out in 2003–04, 2008, and 2020. In 2017, conservation of the stone facade and 3D modelling of the wall paintings were completed under the Cultural Heritage Agency. A new roof of stone slabs was installed in 2019, however, temporary roofing was added on top between 2019–20 to prevent water ingress. Monitoring of the facade and paintings has been ongoing since 2020, the losses and salt activity have been observed since 2017. Emergency interventions were carried out in a few locations in March 2024, based on observed conditions and assessment of risks (See Reports: 2020, March 2024). 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 (13th Century)
The earliest painted scheme is preserved in various parts of the chapel and is executed on a lime-based plaster approximately 1 cm thick, containing inorganic additives. The remaining paint layers principally survive as preparatory work, featuring red contour lines, with some fragments showing remnants of yellow, blue, and red paint.

Painting Scheme 2: Late Layer (17th Century)
Covering almost the entire interior of the chapel, this scheme is applied on a single lime-based plaster up to 1 cm thick, incorporating straw-like and transparent fibrous organic inclusions. The plaster matches that of the 17th-century painting scheme found in the main space of the church (plaster type 3). The plaster is applied homogeneously, and plaster joints are aligned with the original scaffolding levels and scene divisions.
Preparatory techniques include geometric setting out and preliminary drawing, using incised and snapped lines, compasses, stencilled grids, and freehand incisions and painting.

The palette consists of red, yellow, blue, black and white, with gradations achieved through layering or mixing. Two red pigments are identified, along with one type each of yellow and blue. Blue is applied over black or white backgrounds.

The faces of the figures are modelled in two layers: a dark brown base of earth-based pigments mixed with black, and highlights using white pigment. Some facial highlights include a mix of white and red pigments, creating a pinkish tint.

Condition of the paintings

The overall condition of the **primary support** is satisfactory, however there are cracks in the stone and areas of mortar loss. At the lower level of the chapel, stone surfaces exhibit salt damage and signs of biological activity, manifesting as a green patina.

Painting scheme 1 (13th Century):

The condition of the earliest scheme is currently not a significant concern. Most upper paint layers are already lost, and the remaining plaster surfaces are covered by an uneven crystalline salt layer. Biological activity (green patina) is present in the lower parts (dado level).

Painting scheme 2 (17th Century):

The plaster layer of the later scheme is in relatively poor condition, affected by losses and cracking; delamination between the plaster and support layers, or the lower scheme; and powdering and disintegration. Plaster failure and deterioration are mainly related to moisture problems, salt activity and aspects of inherent technological susceptibility, or a combination of these factors. Cracking, for example, results from both technological (shrinkage of the plaster) and structural stress. In addition to plaster deterioration, there is failure of cohesion and adhesion in the paint layers, a problem requiring further investigation.

The chapel's western arch is in particularly critical condition, exhibiting widespread plaster delamination and salt damage. As this side of the chapel adjoins the Western entrance, it has been historically affected by water infiltration.

Environmental conditions

The primary factor influencing the chapel's microclimate is the macroclimate, as interior trends largely mirror exterior conditions. However, during summer, elevated absolute humidity levels recorded on the inside differ from those on the exterior. This may suggest an additional moisture source, such as groundwater nearby or a failure in the spring water pipe system, with moisture potentially being absorbed through the building's foundation.

- Hygral behaviour: The chapel exhibits weak hygral buffering, providing limited regulation of exterior humidity.
- Thermal behaviour: The thermal buffering function is moderate, with the North-West Chapel showing slightly better temperature buffering than other chapels.

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

- Winter and Autumn: High RH (≥70%) occurs infrequently, for about 12% and 21% of the time, respectively. In autumn, minimal RH, 26.5%; maximum RH, 84.4%. In winter, minimal RH, 39.6%; maximum RH, 82.5%.
- Spring: High RH is recorded for approximately a third of the season. Minimal RH, 31%; maximum RH, 92%.
- Summer: High RH increases significantly, about 81% of the season. Minimal RH, 43%; maximum RH, above 95%.

RH levels below 40% were detected on only a few occasions in of the spring, autumn, and winter seasons (no more than 6%), 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 8.07°C and

25.62°C. Interior fluctuations are primarily limited to daily changes of up to 2°C and monthly changes of approximately 6°C.

The North-West Chapel is isolated from the north entrance and the north-east chapel. Air circulation sources include a window in the north wall with an open upper shutter and a door in the west wall connecting to the north-western entrance. The western entrance has two doors: one leading to the narthex and another to the exterior on the north side. Architectural changes in 2024 temporarily left the northern door open, likely increasing air exchange within the chapel and amplifying the exterior's impact on interior humidity and temperature levels.

The influence of the environmental conditions on the deterioration of interior 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). However, further monitoring carried out in 2023–2024 did not detect active salt phase changes (for all 4 types: flakes, crust, crystallise dots, white haze). In contrast, other chapels on the north side of the complex with comparable nitrate-containing salts exhibited deliquescence-crystallization cycles under similar environmental conditions. Salt phase changes in the North-East Chapel may have escaped notice To improve monitoring accuracy, 3D photogrammetric monitoring is planned.

Remedial interventions

Condition monitoring and assessment have identified plaster losses and risks of further deterioration and loss at dado level on the north wall, as well as on the upper part of the west wall and arch. In March 2024, stabilization interventions were carried out on the north wall, including lime-based injection grouting and edge repairs. Conditions have since remained unchanged in the treated area. More emergency interventions will be undertaken in 2025.

List of documentation:

Survey of wall painting technology and condition at the North-West Chapel of the Church of the Virgin Mary in Georgian
Painting schemes of the North-West 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