`Gelati Monastery Complex

The Church of the Nativity of the Virgin Mary

**The South-West Chapel**

Summary of the Survey of the Wall Paintings

2024

Stakeholder: Gelati Rehabilitation Temporary Committee

## Summary


### ***Context***

The construction of the south-west funerary chapel of St. Marine, part of the Church of the Nativity of the Virgin Mary in the Gelati Monastery Complex, dates to the 1130s–1140s. The chapel preserves painting from several periods.

The earliest paintings, visible as small fragments, dates to the 13th-14th centuries. Portraits of historical figures are attributed to the 14th–15th centuries, while the main scheme belongs to the so-called folk art of the 16th century. The iconographic programme of the paintings is consistent with the chapel's funerary function.

### ***Physical history***

The earliest recorded conservation efforts made here in the modern period began in the second half of the 20th century (likely between the 1950s and 1980s). The interventions included the use of gypsum- and lime-based repairs. These are documented in archival photographs, a 2008 survey, and a 2013 report. Subsequent diagnostic studies and assessments were carried out in 2003–04, in 2008.

Historically, the chapel has suffered from water infiltration. In 2012, urgent architectural interventions were carried out, including repairing the roof (utilizing both new and existing tin) and installing a waterproofing layer. Additionally, the interior's concrete floor was removed and replaced with a lime covering.

In 2013, remedial treatment of the wall paintings included injection grouting, replacement of previous plaster repairs, localized consolidation, new repairs, stabilization of the paint layers, and cleaning of surface contamination.

In 2017-18, conservation of the stone facade and 3D modelling of the wall paintings were completed under the Cultural Heritage Agency. A new roof with glazed clay tiles was installed in 2019. However, between 2019–20, a temporary roofing was added on top of this to prevent water ingress. Losses of painted plaster and salt activity have been observed since at least 2017. Monitoring of the facade and paintings has been ongoing since 2020. In 2020, too, an emergency intervention was undertaken to temporarily

stabilise separating plaster, which remains stable. In Autumn 2023, a survey of the wall paintings was begun under the Gelati Rehabilitation Committee. In March 2024, local emergency interventions were carried out to stabilise selected areas at risk of damage and loss (See Reports: 2020, March 2024). In September 2024, the chapel was incorporated under a secondary temporary roofing structure, which will stay in place for the duration of the current conservation project.

***Original technology***

In the latest survey, five distinct painting schemes have been identified based on compositional and stylistic features, and on the superimposition of the different phases. Further investigations will be carried out determine their dating more precisely.

**Painting Scheme 1 and 2** survives as fragments in various parts of the chapel, such as the vault and eastern wall. **Scheme 3** is limited to the north-west corner and northern vault. **Scheme 4**, characterized as the main folk art scheme, is well preserved across all walls and vaults. **Scheme 5** is found at dado level, in the window recess and east door recess, and in the tympanum.

The distribution of these schemes throughout the chapel has been documented graphically.

**Painting Scheme 1 (13$^{th}$ century?)** preserves some figurative details in red, yellow, green, and black, executed on a yellowish-white plaster with coarse-grained inorganic filler and organic inclusions. The fragments suggest that a major figurative scheme was originally present.

**Painting Scheme 2 (13$^{th}$- 14$^{th}$ centuries?)** survives very scantly, visible as red, yellow, and green paint traces on a grey plaster layer with a medium-grained inorganic aggregate component.

**Painting Scheme 3 (14$^{th}$- 15$^{th}$ centuries)** depicts four historical donor figures painted in red (dark red and pinkish), yellow, green, blue, grey, and white colours on a uniform white plaster containing only organic inclusions.

**Painting Scheme 4 (16$^{th}$ century)**, the chapel's primary scheme, iconographically evidence its funerary purpose. It features donors, a row of saints, and scenes such as the Crucifixion, Transfiguration, and Descent into Hell. The palette is distinguished by various shades of red (dark red, pinkish red), yellow, greyish black and green (the latter limited to the arch ornaments), executed on a yellowish-white plaster with coarse-grained inorganic aggregates and organic inclusions.

**Painting Scheme 5 (16th century?)** is purely decorative, featuring curtain drapery, plant motifs and geometric shapes. Executed with black, red, and yellow pigments on a thin white plaster, the painting may have been executed as a repair/historic restoration of the chapel's dado decoration.

***Condition of the paintings***

The condition of the chapel varies due to both historic and recent damage/deterioration factors. All five painting schemes exhibit losses to varying degrees, including complete and partial losses, as well as specific forms of deterioration limited to the painting layers.

Painting Scheme 3, found in the northwestern corner, is in the best condition compared with the others. In contrast, the eastern vault shows the most extensive and varied deterioration, primarily caused by water infiltration. This has led to deterioration such as salt activity (manifesting as crusts, crystalline dots, white veils and fluffy flakes), biological colonisation, and other associated issues. Salt efflorescence is evident throughout the chapel but is most pronounced on the east wall, vault, the south part of the western vault, and on the dado level of the south wall.

The most alarming failure is plaster delamination, which places painting at high risk of collapse and loss. Addressing adhesion failures between the layers is particularly challenging due to the complex stratigraphy of the overlapping painting schemes. Treatment must therefore be meticulously planned and carefully executed, with priority given to specific sections based on the severity of the deterioration. Additionally, recent repairs of plaster losses and edges, carried out during the 2013 conservation work, have been compromised by water infiltration and now require removal/replacement.

The paint layers are also adversely affected by pigment alteration and darkening. Paint loss in Scheme 4, particularly of pinkish-red pigments, appears to be specifically linked to inherent faults in its painting materials and techniques.

***Environmental conditions***

The primary factor influencing the chapel's microclimate is the macroclimate, as the interior conditions closely follow exterior trends. However, during the summer, the interior absolute humidity values were significantly higher than those on the exterior, which might suggest an additional source of humidity. Throughout 2024 absolute humidity (AH) levels ranged between **3 and 23.27 g/m$^3$**.

- Hygral behaviour: The chapel exhibits weak hygral buffering, providing limited regulation of exterior humidity.
- Thermal behaviour: The thermal buffering function is relatively moderate.

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

- Winter and Autumn: High RH (≥70%) occurs infrequently, for about 22% and 15% of the seasons.
- Spring: High RH is recorded half of the season (56%).
- Summer: High RH increases significantly, for 93% of the season.

RH levels below 40% were detected on only a few occasions in the winter (about 1.9% of the season), while in summer, spring and autumn they did not drop below this threshold at all.

According to the 2024 data, annual temperature on the exterior ranges from -3.95°C to 39.05°C. On the interior of the Chapel, recorded temperatures vary between 6.89°C and 26.35°C. Interior fluctuations are primarily limited to daily changes, approximately 1 or maximum of 2.5°C, and monthly changes up to 8.68°C.

The spatial connections are organized as follows: the southern entrance opens to the exterior through a door on the south wall; internally, individual doors communicate with the south-west and south-east chapels; and a door in the north wall connects to the main space of the church. This arrangement creates a network of interconnected spaces, each facilitating movement and interaction within the structure and the exterior. Each of the southern chapels has two windows equipped with wooden shutters, allowing for further air exchange with the exterior.

The spatial interconnection and the distribution of these openings account for the similarities in environmental tendencies, such as temperature and humidity levels, across these areas. However, the southern entrance shows slightly higher variations in humidity and temperature compared with the south-west and south-east chapels. This difference is likely influenced by the function of the exterior door in the southern entrance, which exposes it more directly to external conditions.

Significant changes to the paintings activated by environmental conditions were observed between 2021 and 2023. During this period, the paint layers began to flake and fine salts dissolved. Specifically in Autumn 2023, when humidity was low (10/2023: 19.25 °C; 63%), paint flaking occurred. In summer, salt dissolution was observed during periods of high humidity (06/07/2022 and 17/10/2023: 22.8 °C; 78.7%).

No new salt activity or additional damage to the painting has been recorded after November 2023, though salt phase cycles may have been missed.

***Remedial interventions***

Wall painting monitoring has identified plaster losses and the risk of further deterioration at the unpainted dado level on the North wall of the chapel, as well as the upper part of the southern wall and vault. In March 2024, due to the high risk of mechanical damage to

the painted plaster layer on the North wall, as high risk of plaster loss on the southern wall emergency interventions were carried out, including lime-based lightweight injection grouting and where was needed compatible lime-based edge repairs. Since then, the painting has been stabilized and remains in stable condition, with no salt activity or other changes observed.

## List of Literature

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