

# **The Kyrenia Ship Conservation Project**

## **Kyrenia Ship Collection: Preservation Update**

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## **General Introduction**

April 2018 marked almost a year since the end of the remedial and preventive treatment of the Kyrenia Ship objects, and 6 months since Veronica Ford, assistant conservator, last visited the island in October 2017. During this trip, Veronica carried out several different conservation activities including rehousing objects and adding additional padding to packaging, along with relevant environmental monitoring, maintenance and preventive conservation activities.

## **Kyrenia Ship: Preservation Update**

### **Summary**

As in October 2017, Veronica assessed the current preservation state of the objects at Kyrenia Castle, finding again that overall the objects were stable, with little sign of change. The relative humidity and temperature data was downloaded from the TinyTag devices, the silica gel placed within the metal objects was refreshed, and the pest traps were replaced. The opportunity was also taken to rehouse additional objects and increase the padding in some of the boxes – in particular those containing important pieces of wood from the ships structure. In total, the conservator spent 3 days working at Kyrenia Castle.

### **Environmental Monitoring**

As in October 2017, Veronica's first concern was to carry out a quick condition assessment of a sample of the smaller objects in the storeroom and on display, to check if degradation had occurred. As was previously the case, no visible change in condition was observed in any of the assessed objects, indicating treatment had been successful and that packaging and storage was doing an excellent job at protecting objects from the environment.

Following this the silica gel from the housing of some of the metal objects was refreshed. The regular replenishment of the silica gel is essential to maintain a lower relative humidity which protects the most vulnerable metal objects from corrosion. The silica gel turns from orange to green when it has absorbed the maximum amount of moisture, and it was found that this was the case for the majority of objects. The oven purchased in October 2017 was utilized for this purpose.



**Figs.1-2: Photographs of the replaced silica gel in the coins storage (left) and the oven required for dehydrating green silica gel (right) (Photographs courtesy of Veronica Ford, 2017).**

The pest traps placed around the Kyrenia Ship Storeroom were also collected, their contents recorded, and then they were replaced with new traps. Again, the results indicated that there are few pests in the vicinity of the castle that are likely to be a threat to the collection beyond a few silverfish, with a large quantity of ants, as well as flies and spiders.

Perhaps one of the most important tasks was downloading and interpreting the environmental data from the TinyTag data loggers. Again, this was done in conjunction with Owen Gander to ensure he gained additional support and training to be able to carry this out independently, if necessary, in the future. With the installation of the air conditioning in April 2017, the conservator was keen to understand how this has impacted on the environment over the intervening 6 months since the data was last downloaded.

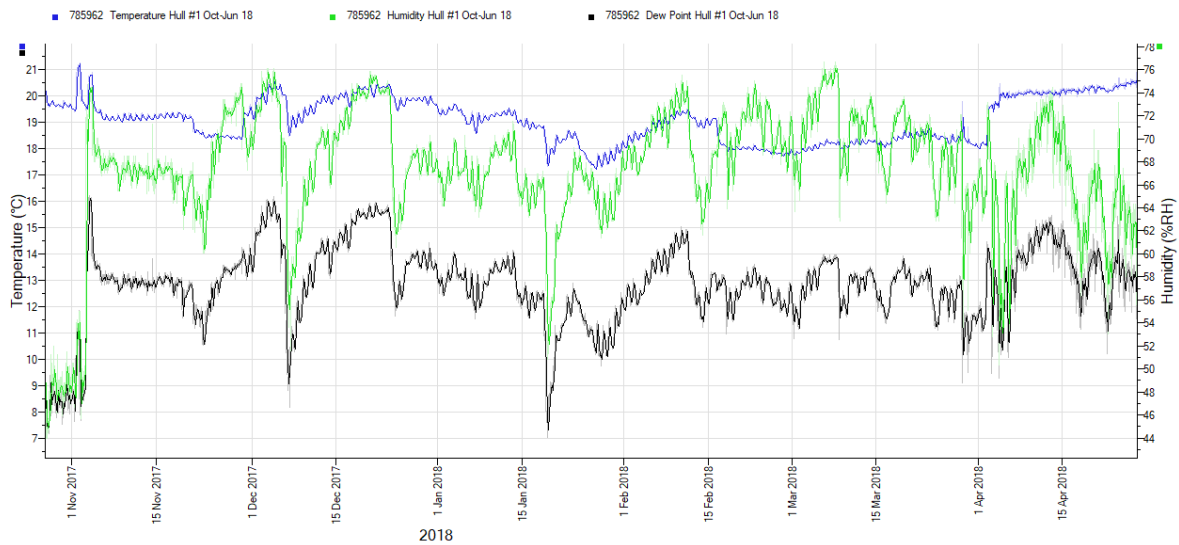
October to April consists of the autumn, winter and early spring seasons in Cyprus, where external conditions are typically cooler (though still mild), with some rain. Logging ran between October 27<sup>th</sup>, 2017 and April 27<sup>th</sup>, 2018 with all 6 loggers recording data every 20 minutes.

### **Kyrenia Ship Gallery**

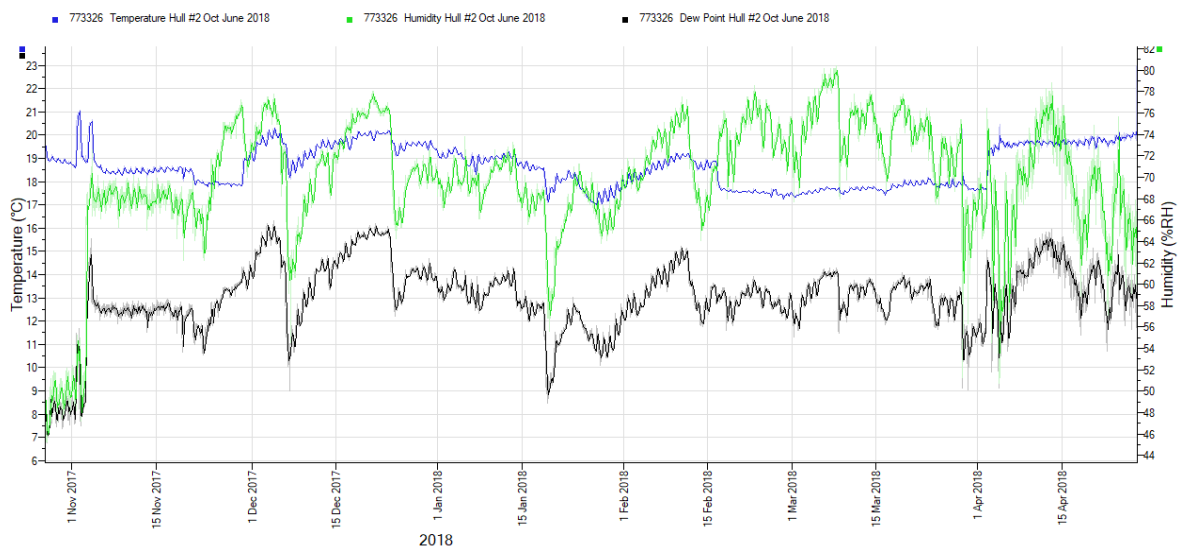
In the Kyrenia Ship Gallery (as seen by the graphs for 'Hull #1' and 'Hull #2' below) temperature was again relatively stable, as was seen over the preceding summer period, ranging between 17.0°C and 21.3°C. Again, this is likely largely to do with the presence of air conditioning in the gallery. Overall, logger 'Hull #1', in the midships area on the port side of the ship, recorded a slightly higher average temperature at 19.0°C, versus 'Hull #2', in the bow area on the starboard side of the ship, where the average reading was 18.6°C.

Greater fluctuation was again evident in the relative humidity recorded by both loggers, although 'Hull #2' demonstrates the greater degree of fluctuation. Over the whole gallery, **the relative humidity recorded varied between 43.9% and 80.5%, with an average relative humidity of around 68.7%**. This is slightly more humid than the preceding summer as might be expected due to seasonal variation. Although, this is not ideal, fluctuations tended to occur over a comparatively long time, over hours rather than minutes. The occasions where humidity is high are particularly concerning, as at **over 60% relative humidity mold growth is possible**.

### Hull #1 – October 2017 to April 2018

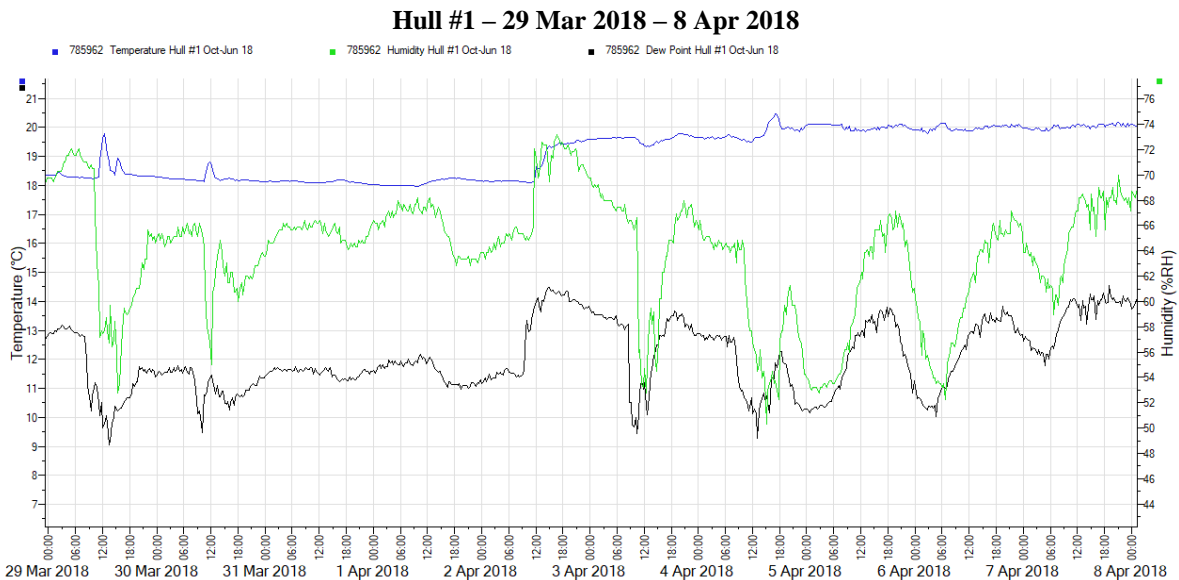
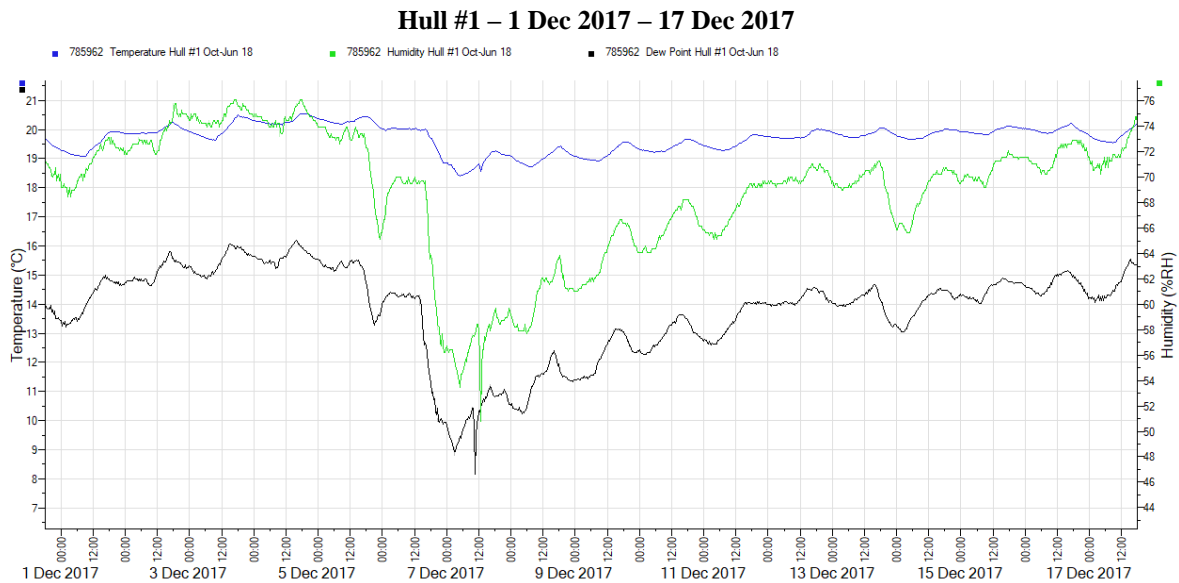


### Hull #2 – October 2017 to April 2018



**Figs.3-4: Graphs tracing the temperature, relative humidity and dew point in the Kyrenia Ship Gallery between October 2017 and April 2018 (Graphs generated by TinyTag software, 2018).**

The extent of the fluctuations can be seen more clearly when the data is expanded and viewed more closely. For example, from looking closely at two periods of time in the expanded graphs below, December 1<sup>st</sup> 2017 – December 17<sup>th</sup> 2017 and March 29<sup>th</sup> 2018 – April 8<sup>th</sup> 2018 it is clear that there are some significant fluctuations, even within a 24 hour period. For instance, at midday on December 7<sup>th</sup> 2017, 'Hull #1' recorded a relative humidity of 70% but 24 hours later the relative humidity rapidly dropped to 51%, a difference of nearly 20%. Similar regular dramatic fluctuations are evident from the end of March to the beginning of April 2018. The causes of these fluctuations will be investigated, and may be due to activities in the Ship Gallery on these days or fluctuating external conditions. Historical weather data for December 2017 suggests the 6<sup>th</sup> was rainy and the 7<sup>th</sup> dry, suggesting external weather conditions have a strong impact on the relative humidity in the Ship Gallery.



**Figs.5-6: Expanded graphs tracing the temperature, relative humidity and dew point in the Kyrenia Ship Gallery in December 2017 (top) and March to April 2018 (Graphs generated by TinyTag software, 2018).**

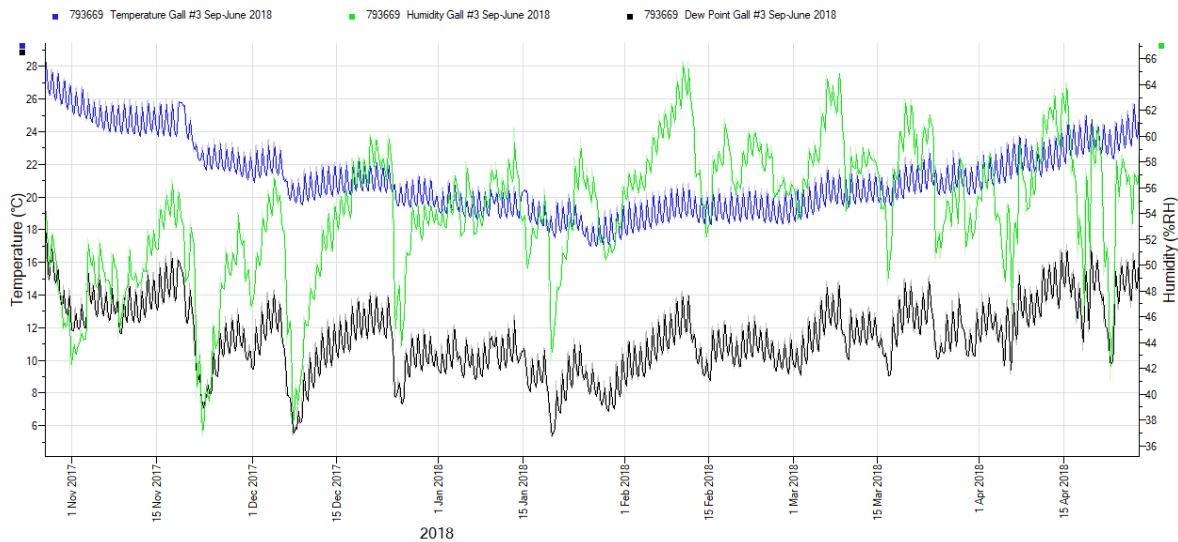
## Kyrenia Ship Museum Gallery

In the Museum Gallery, where there is no climate control, as previously seen, temperature demonstrated a daily fluctuation, probably corresponding to a temperature increase when the lights in the display cases were on. In addition, there is a gradual decline in temperature during the autumn and winter months, followed by a temperature rise as the temperature rises outside. **During this 6-month period temperature ranged between 15.6°C and 28.3°C.** The logger Museum 'Gallery #3' (in the case with Lead Brail Rings) recorded slightly higher temperatures than Museum 'Gallery #4' (in the case with the Lead Curse Tablet) in general, with an average of around 0.8°C higher.

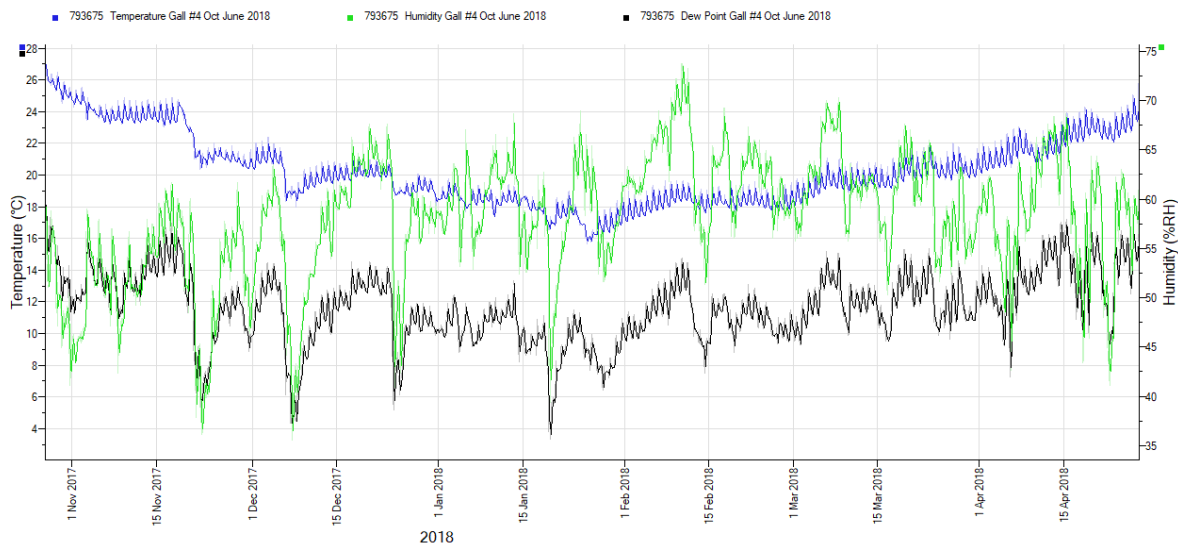
The relative humidity recorded in both instances fluctuates considerably and more irregularly when compared with the loggers in the Kyrenia Ship Gallery 'Hull #1' and "Hull #2'. Both recorders suggest a similar pattern, which most likely corresponds to a rise and fall in the external environment, both for example demonstrating a sharp drop in relative humidity on the 22<sup>nd</sup> November 2017. Overall,

'Gallery #3' showed a smaller range of relative humidity of 36.7% - 65.8%, whereas 'Gallery #4' recorded a range of 35.5% - 73.8%. This is likely connected to the location of these two display cases, with 'Gallery #4' positioned at the corner closer to the extremities of the building and therefore is more likely to reflect external fluctuations. This is a slight concern given that this case contains the Lead Curse Tablet, which should ideally be kept in dry conditions and at a relatively stable relative humidity.

**Museum Gallery #3 – October 2017 to April 2018**



**Museum Gallery #4 – October 2017 to April 2018**



**Figs.7-8: Graphs tracing the temperature, relative humidity and dew point in the Museum Gallery between October 2017 and April 2018 (Graphs generated by TinyTag software, 2018).**

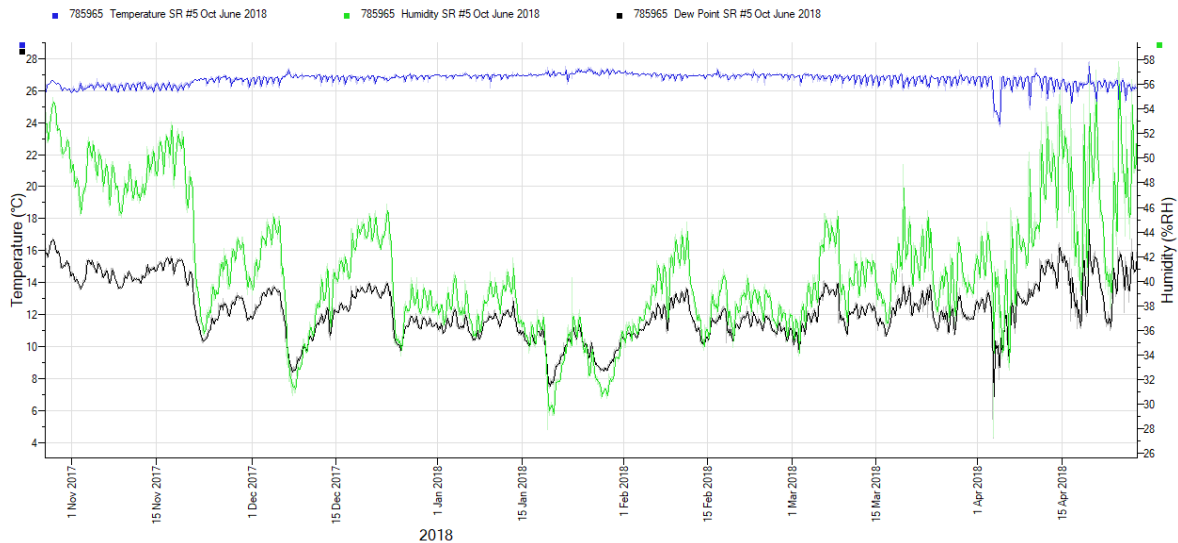
### Kyrenia Ship Storeroom

In the Kyrenia Ship Storeroom, the overall temperature was stable due to the air conditioning, varying between 23.5°C and 27.8°C. The fluctuations in April are largely a result of the air conditioner being switched off during the day when people were working in the Storeroom. The air conditioner has been set to 27°C in order to ensure relative humidity remained under 65%. When the air conditioner was switched off, the drop in temperature often caused a corresponding rise in relative humidity.

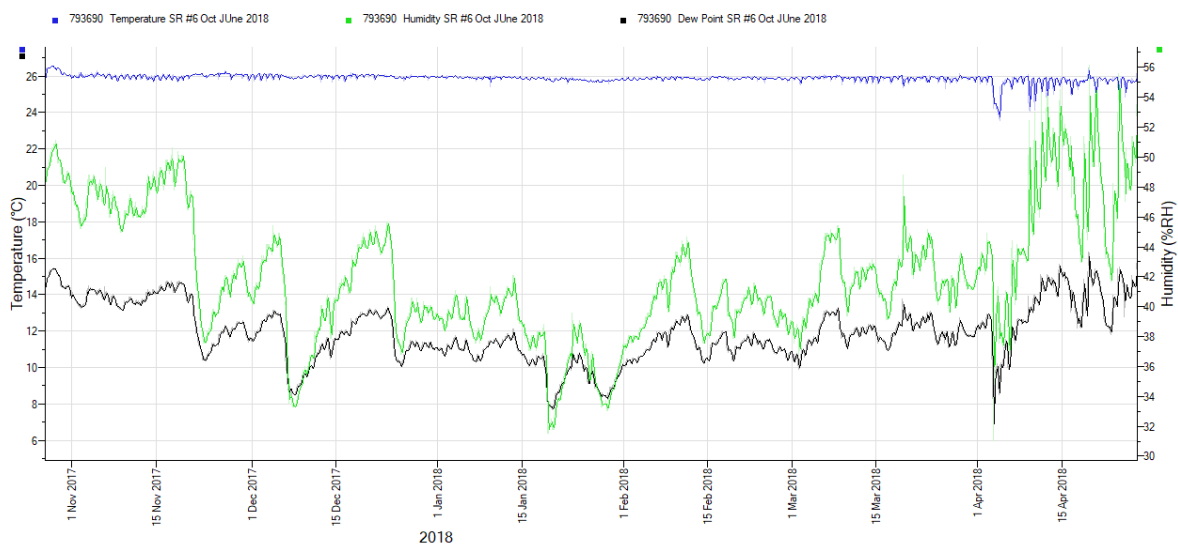
In terms of relative humidity, the Kyrenia Ship Storeroom overall had a lower overall relative humidity compared to unconditioned areas like the Kyrenia Museum Gallery. Relative humidity ranged

between 27.2% and 57.9% in 'Storeroom #5' and 31.0% and 56.1% in 'Storeroom #6'. Again, in general, fewer fluctuations were recorded by 'Storeroom #6'; this is likely due to the buffering effect of the metal cabinet, where the logger is stored.

#### Storeroom #5 – October 2017 to April 2018



#### Storeroom #6 – October 2017 to April 2018

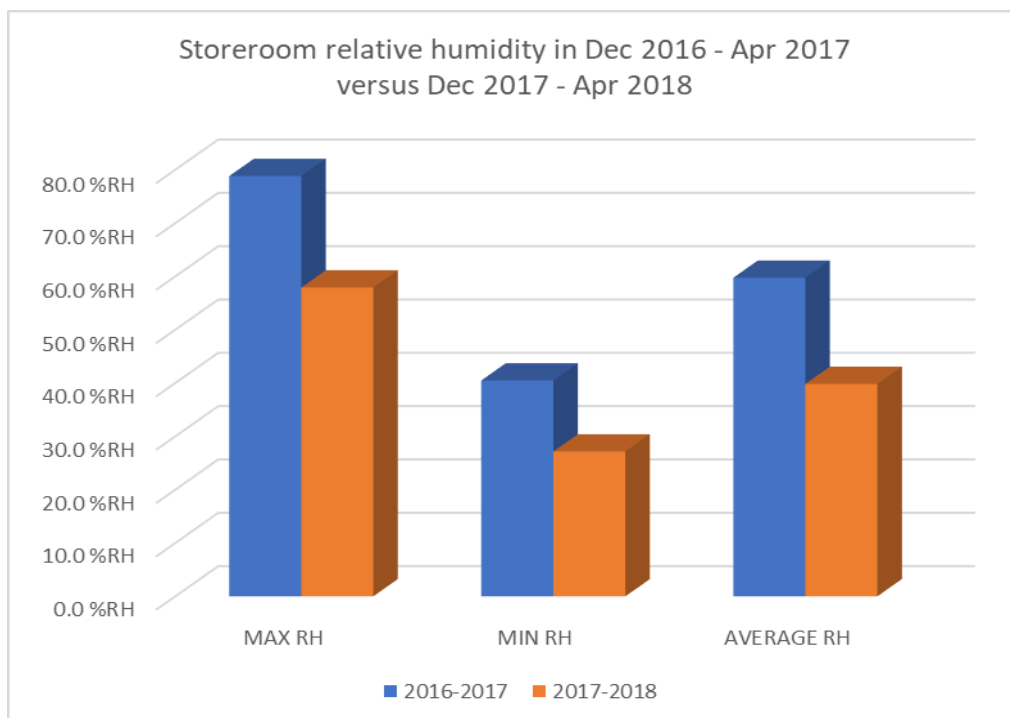
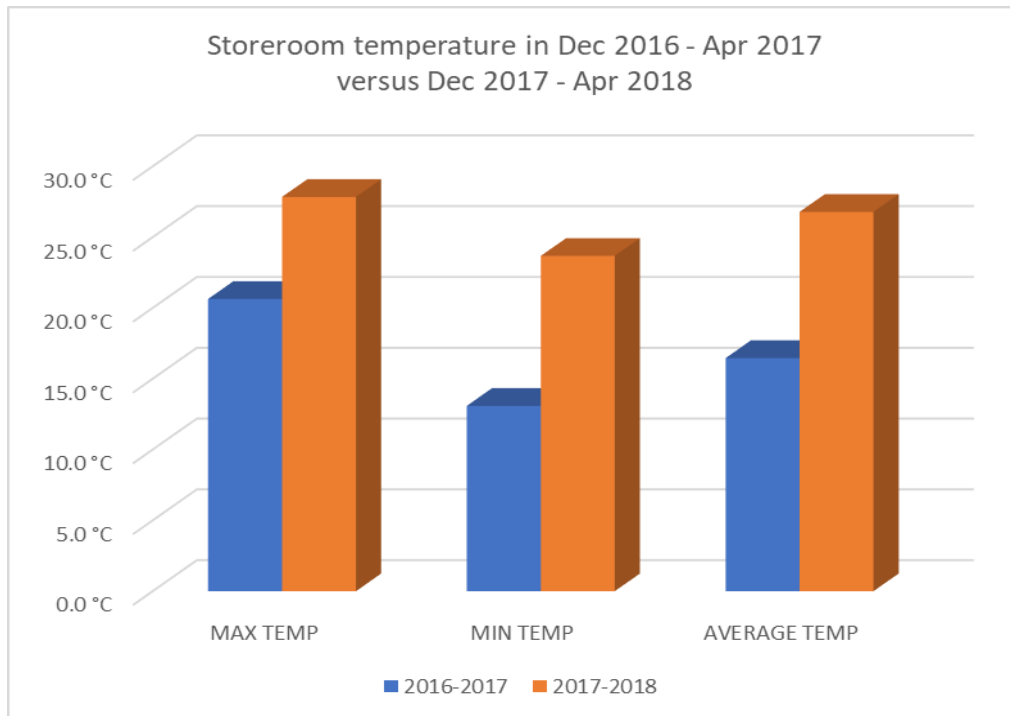


**Figs.9-10: Graphs tracing the temperature, relative humidity and dew point in the storeroom between October 2017 and April 2018 (Graphs generated by TinyTag software, 2018).**

Some concern has been raised about the high temperature of 27°C in the Storeroom, which was selected as it was most likely to ensure relative humidity remained under 60% which is crucial to prevent mold growth. Although temperature and its fluctuations do not have as great an effect on preservation as relative humidity, this higher temperature is not ideal for storing the objects, therefore it may be preferable to install relative humidity control in addition to the temperature control in the Storeroom. Comparing temperature and relative humidity between December 2016 to April 2017 (prior to the installation of the air conditioning unit) with data from December 2017 to April 2018 shows that, by increasing the temperature, **the average relative humidity has been reduced and remained under 60% for the entire period, although it did drop as low as 27.2%. The ideal relative humidity for the collection would be 45-55%. Therefore, there are times when relative humidity is**



considerably lower than desired. Installing relative humidity control would therefore be highly desirable.



**Figs.11-12: Bar charts showing the maximum, minimum and average temperatures and relative humidity in the Storeroom for December 2016 to April 2017, compared with December 2017 and April 2018 (Graphs courtesy of Veronica Ford, 2018).**

## Rehousing, packaging and cleaning

Kyrenia Ship Storeroom

As well as undertaking the preventive conservation and environmental monitoring activities detailed above, Veronica, and members of the Kyrenia Ship team Helena Wylde Swiny, Robin Piercy and Owen Gander, were also able to carry out essential cleaning of display areas along with several rehousing and packaging jobs. Additional padding, using spare archival plastazote foam, was added to existing wood packaging to better protect important structural elements of the ship and detached elements of its hull. In addition, several small wood and lead objects were rehoused.

### **Kyrenia Ship Gallery**

In addition, earlier in April 2018, the hull of the ship was extensively cleaned by Pembe Özen, Conservator Archaeologist of the Department of Antiquities, and a team of 3 local Cypriots. As well as vacuuming, 96% alcohol was used to clean the ship on the 24<sup>th</sup> April 2018, which helped to pick up more engrained dust on the top surfaces of the strakes, ceiling planking, mast step, the keel and the garboard strakes attached to the keel. A total of 4900ml of alcohol was used for this purpose. This was necessary as the ship had not been cleaned for several years, resulting in a considerable build-up of dust which could not be removed by vacuuming alone. Revealing the ship's hull was particularly crucial at this time due to the planned photo scan of the ship's hull (which was successfully completed later that month). Pembe Özen will write a separate report providing more detail about this work.

New lighting has also been installed in the Ship Gallery. This has resulted in considerable improvements – the new lights are higher up and less visually obstructive and have resulted in the gallery being better lit and therefore safer for visitors, details of the ship are now more visible, and the increased distance between the lights and the hull has reduced the quantity and strength of light (lumens) that reaches the ship. This is beneficial for its long-term preservation.



**Fig.13 – The Kyrenia Ship hull showing the location of the new lighting in the gallery above the current walkway. The two bell-shaped lights (left and right) will be removed in the future (Photograph courtesy of Veronica Ford 2018).**

### **Kyrenia Ship Museum Gallery**

In the Kyrenia Ship Museum Gallery, Helena, Robin and Owen cleaned the 1:1 scale reconstructed model of the ship and Veronica and Helena updated the ceramic displays and gave some of the display cases a clean, freshening and brightening current display. The display case under

the staircase to the Ship Gallery was opened and cleaned using paintbrushes and a vacuum, during the week of April 16<sup>th</sup>. A slightly damp cloth was used to remove excessive dust from some of the wooden objects in this case, considerably improving their appearance. Owen was also able to use 96% alcohol to clean some of the wooden toggles and spoons on display in the gallery, again improving the general quality of the cases.



**Figs.14-16 – Helena, Robin and Owen cleaning the 1:1 scale ship model (top) and the two clean ceramic display cases with added ceramics (bottom) (Photographs courtesy of Veronica Ford 2018).**

## **Future Recommendations**

In April, much has been achieved in improving the Museum's displays as well as carrying out ongoing maintenance to ensure the preservation of the ship and its contents. Many of these improvements, particularly those in the Ship Gallery, are interim measures before more extensive work

can be carried out. The lead curse tablet, which is both very important from a curatorial perspective, and currently vulnerable to degradation due to the unstable environment, will soon be relocated to a more stable environment within the gallery. **In addition, the purchase of a humidification control unit for the Kyrenia Ship Storeroom should be seriously considered, as high and fluctuating relative humidity is a serious threat to the collection. This unit would require regular quick checks by local castle employees to ensure that it continues to run and the collected water drains properly. But it is very important for the preservation of the antiquities and would allow the air-conditioned temperature to be reduced.**

As previously emphasized, ensuring the long-term preservation of the Kyrenia Ship is an ongoing task, which requires continual effort and maintenance. Environmental monitoring, condition checks and maintenance therefore need to be ongoing, carried out at least every 6 months. Ideally local museum specialists should be assembled to undertake this work in the future. This is the most sustainable and realistic plan to ensure the preservation of this invaluable part of the island's heritage.