

# **The Kyrenia Ship Conservation Project**

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

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## General Introduction

October 2017 marked 5 months since the end of the remedial and preventive treatment of the Kyrenia Ship objects as well as the 100th anniversary of Honor Frost's birthday. The perfect opportunity to present the conservation achievements of the project was provided by the organization of a conference on Cyprus - *Under the Mediterranean: 100 years on... The Honor Frost Foundation conference of 'Mediterranean Maritime Archaeology' to commemorate the Anniversary of the Centenary of Honor Frost's Birth on the island of Cyprus (27 October 1917)* organized jointly by the Honor Frost Foundation, the University of Cyprus, and the University of Southampton. As well as being given the opportunity to present a poster (co-authored with Cassy Cutulle), conservator Veronica Ford returned to Kyrenia to check the objects and ensure no further degradation had occurred, as well as carry out essential preventive conservation activities and maintenance.

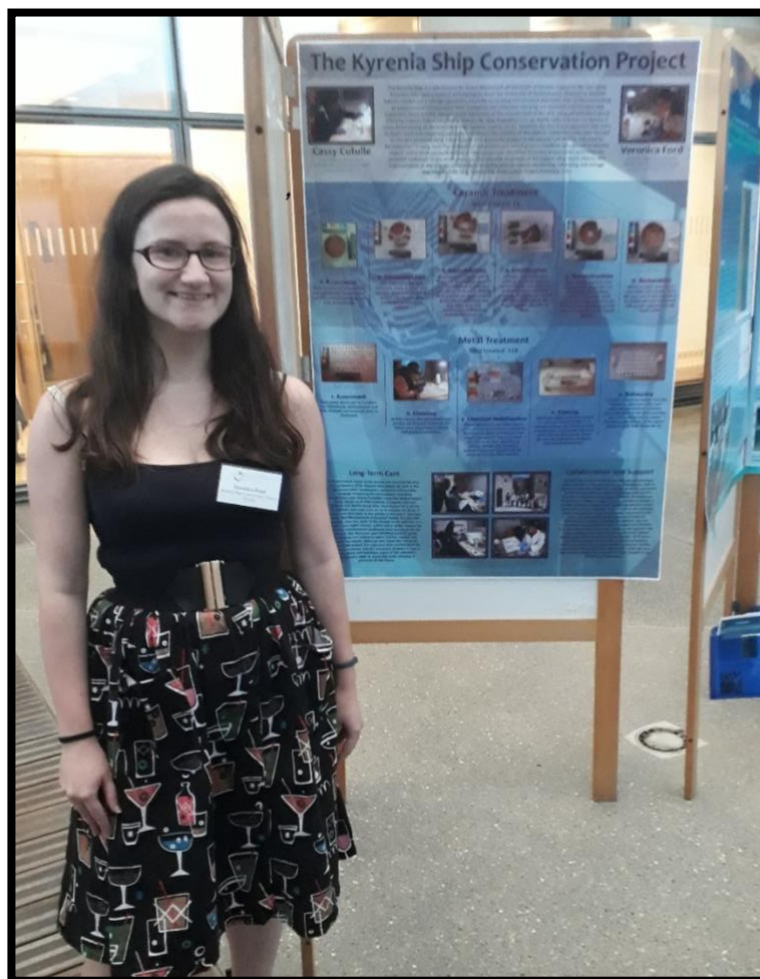
## Honor Frost Conference

### Summary

The conference consisted in total of five days and ran from October 20<sup>th</sup>-October 24<sup>th</sup>, 2017. During the first four days over 100 papers and 50 posters were presented, covering all aspects of Mediterranean Maritime Archaeology – from ship construction through archaeological science through trade and harbor networks – giving a fascinating insight into current research and developments in the field. Highlights for the conservator included learning more about the life of Honor Frost, as well as about other archaeological discoveries on Cyprus and how modern technology can aid in archaeological reconstruction. On the final day, conference delegates were given the option of going on an excursion, visiting archaeological sites, museums or having the opportunity to sail on the reconstruction of the Kyrenia ship, the *Kyrenia Liberty*. The conference was truly international, with over 300 delegates and, for Veronica Ford, this therefore constituted an invaluable opportunity to exchange ideas, broaden horizons and connect with other professionals and academics in the world of maritime archaeology.

### Poster Presentation

On October 21<sup>st</sup> and 22<sup>nd</sup>, Veronica presented a poster at the conference which showcased the conservation work that both conservators carried out over the duration of the project. Cassy and Veronica both designed the poster and contributed to its content, discussing and finalizing it via video conference sessions. The presentation of this poster in Cyprus was an excellent opportunity to engage with both the local Cypriot community and the international academic community and to champion the importance of conservation in ensuring that important archaeological finds are preserved. Veronica found this a very rewarding experience and really enjoyed being able to talk one-on-one to other researchers about the project. After the conference, the physical copy of the poster was taken to Kyrenia Castle and presented to senior staff from the department of antiquities. The intention is that it will be mounted and displayed in the Kyrenia Ship Museum Gallery so that visitors can learn about the project.



**Fig.1: Conservator, Veronica Ford presenting a poster at the Honor Frost Conference *Under the Mediterranean: 100 years on...* on October 21<sup>st</sup>-22<sup>nd</sup> 2017 (Photograph courtesy of Wes Forsythe, 2017).**

### **Poster Abstract**

In 2015, over 40 years after its excavation, many of the finds from the iconic and unique Kyrenia Shipwreck were found to require urgent care to halt rapid deterioration and to ensure its long-term preservation. The personal effects of the Ship's crew, including the smaller ceramics and metals, were most in need of treatment. Thanks to financial support from the Honor Frost Foundation, under the umbrella of the bi-communal Technical Committee on Cultural Heritage, and the overall coordination of the United Nations Development Programme (UNDP) in Cyprus, a conservator, Cassy Cutulle, was hired to undertake condition assessments of the collection and prioritize objects for treatment. An additional conservator, Veronica Ford, joined the project in early 2016.

In the case of the ceramics, the remedial treatment involved the renewed removal of salts which had been absorbed underwater and during the long storage in Kyrenia Castle, through immersion desalination, followed by the reconstruction and restoration of the best examples of the pottery. The primary focus of the metal treatment was on stabilization and protection from the external environment, through immersion in Benzotriazole and coating using an archival acrylic adhesive. At the same time, a preventive conservation program was implemented, which included the monitoring of pests and the installation of long term environmental monitoring devices at Kyrenia Castle to measure fluctuations in

relative humidity and temperature. The final stage of the project was to rehouse some of the sensitive objects in Kyrenia Castle including in particular the wood and metals.

At its conclusion, this project achieved its essential aims: the remedial conservation of the small ceramic and metal finds; and the long-term preservation of the Collection through preventive activities. In adherence to ethical conservation standards, collaboration and consultations were carried out with the original excavation team throughout the duration of the Project.

## **Kyrenia Ship: Preservation Update**

### **Summary**

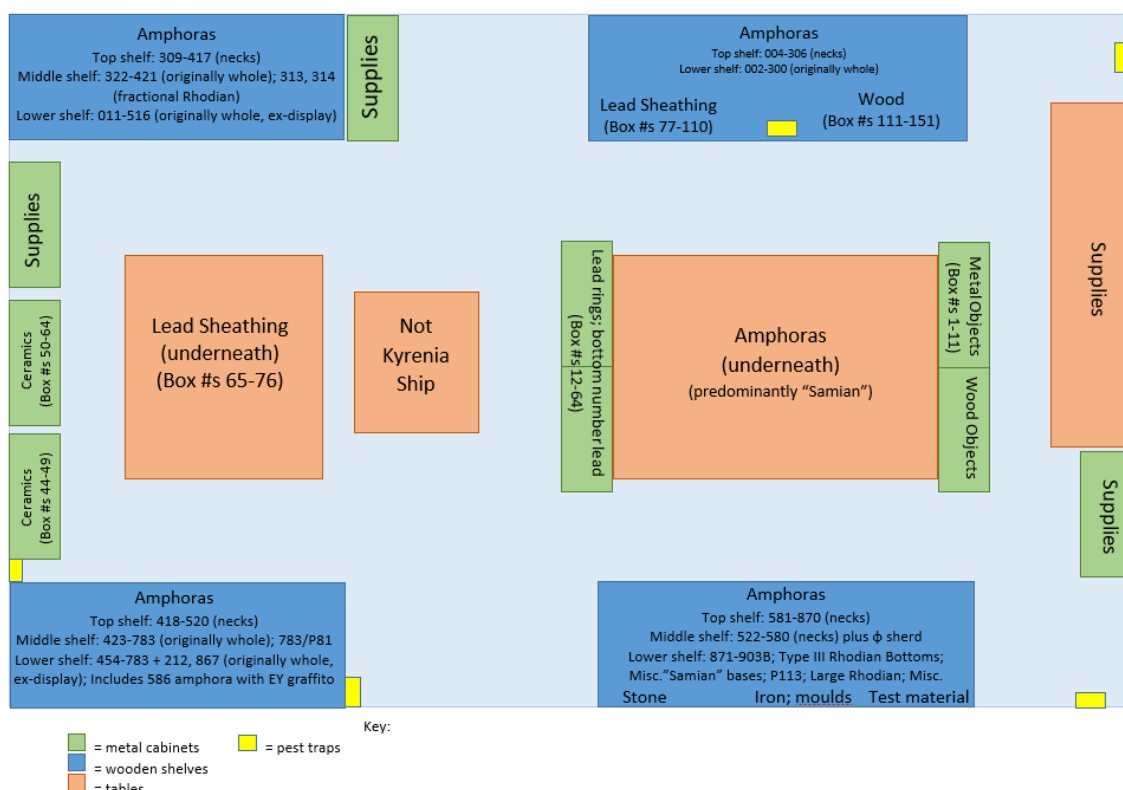
After the conference, Veronica visited Kyrenia Castle to assess the preservation state of the objects 5 months after the project was completed. Overall, the objects appeared to be secure and well-looked after, with little sign of change in the intervening months. The opportunity was taken to download the temperature and relative humidity data from the TinyTag devices, to check and replace pest traps and to carry out essential preservation maintenance such as replacing the silica gel within the packaging of the metal objects. In addition, tours were given to delegates of the conference who visited the castle in the days after the conference. In total, the conservator spent 4 days working at Kyrenia Castle.

### **Tours and Collaboration**

During the conference, numerous researchers expressed an interest in visiting the Kyrenia Shipwreck to Helena Wylde Swiny and Robin Piercy (members of the Kyrenia Ship Team) and Veronica Ford (conservator). During the following week, private tours of the public galleries were given and Robin Piercy arranged to take groups underneath the hull of the ship where they could better examine the ship's construction and view details up close. The conservator was also able to show groups some examples of the conservation work along with the Ship Storeroom. This was an excellent opportunity to share the ship and its contents with experts in the maritime archaeological field and generated much academic discussion.

The week at the castle also allowed Helena Wylde Swiny, Robin Piercy, Owen Gander and Veronica Ford to meet in person for the first time since the end of the conservation project. The opportunity was taken to update the Storeroom Plan through consultation with the Kyrenia Ship Team. Constructive discussions and meetings were also had with members of staff from the castle to update them on the project and share further recommendations and information about the objects' long-term care.

## Kyrenia Ship Storeroom Plan (Oct 2017)

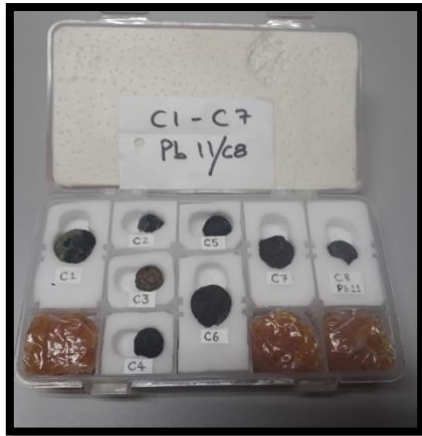


**Fig.2: The updated Storeroom plan (Plan courtesy of Veronica Ford, 2017).**

### Environmental Monitoring

A key concern for the conservator was to catch up with some of the preventive conservation tasks at the Castle. First, Veronica carried out a quick condition assessment of the objects in the storeroom and on display, selecting a sample of objects and checking whether degradation had occurred. No visible change in condition was observed of the objects assessed, indicating treatment had been successful and that packaging and storage was doing an excellent job at protecting objects from the environment.

The next task was to go through the boxes of the metal objects and replace the silica gel. This silica gel was added to the most vulnerable metal objects in the collection to reduce humidity, thereby reducing the likelihood of corrosion. Silica gel requires regular replenishment, which is indicated by a color change from bright orange to green. To replenish the gel, it needs to be heated in an oven to desiccate it and return it to its orange color. Robin Piercy purchased an oven for the Storeroom, streamlining the process of refreshing the silica gel. Instructions were written by the oven to allow others to replace the silica gel in the future.



**Figs.3-4: Photographs of the replaced silica gel in the coins storage (left) and the newly purchased oven required for dehydrating green silica gel (right) (Photographs courtesy of Veronica Ford, 2017).**

Another priority was to check the pest traps in the Storeroom, record their contents and replace them. The results indicate that there are few pests that are a threat to the collection, the traps mainly catching ants, spiders and flies.

Finally, a very important task was to download the environmental data from the TinyTag data loggers. This was done in conjunction with Owen Gander, who was given further training to allow him to become more comfortable doing this in the future. The conservator was particularly keen to look at the data and determine how seasonal change has affected the environment. It had been 5 months since the data was last interpreted and analyzed by a conservator, therefore more in-depth analysis was required.

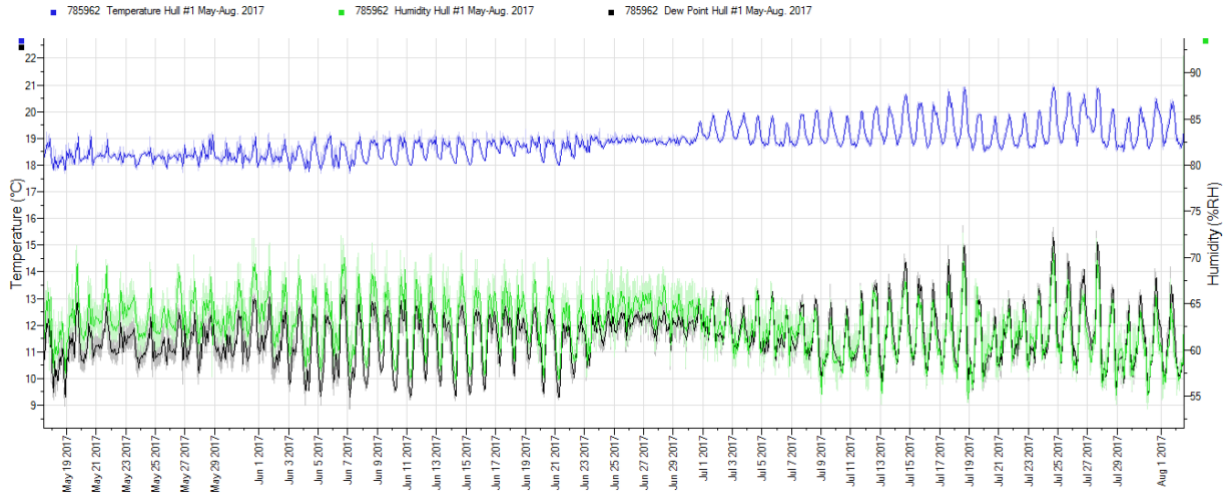
### **May to September 2017**

May to September consists of the high summer period in Cyprus, where external conditions are typically very hot and dry. Logging ran between May 17<sup>th</sup> and September 5<sup>th</sup>, with all 6 loggers recording data every 7 minutes.

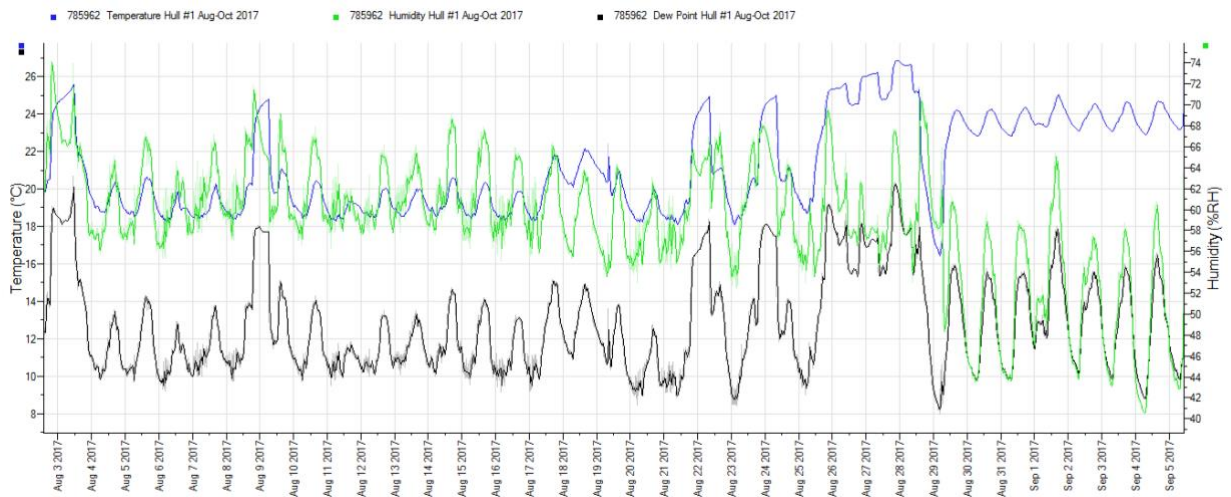
In the Ship Gallery (as seen by the graphs for 'Hull #1' and 'Hull #2' below) temperature remained relatively stable, between 17.7°C and 24.2°C, as might be expected due to the presence of the air conditioners. Overall, logger 'Hull #2' recorded a slightly higher average temperature at 20.1°C versus 'Hull #1' where the average reading was 18.9°C. 'Hull #1' is located on the Starboard bow side of the ship, near to the air conditioning unit, whereas 'Hull #2' is on the port side in the midships area, which may explain the temperature difference.

Greater fluctuation is evident in the relative humidity recorded by both loggers, although 'Hull #2' demonstrates the greater degree of fluctuation, again this is likely due to the location of the air conditioner closer to 'Hull #1'. Over the whole gallery, relative humidity recorded varied between 40.4% and 74.2%. 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.

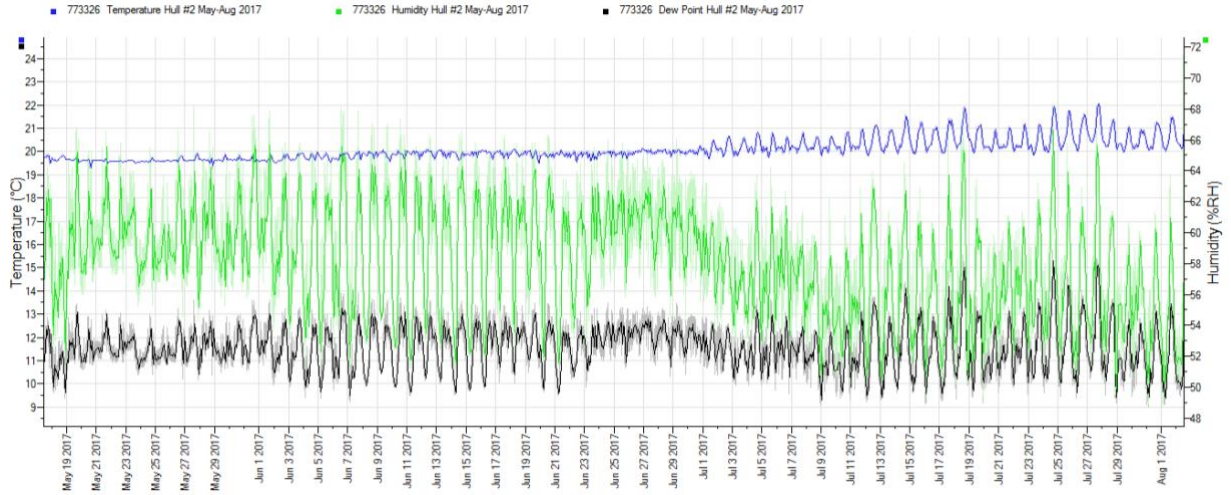
### Hull #1 – May to August 2017



### Hull #1 – August to September 2017

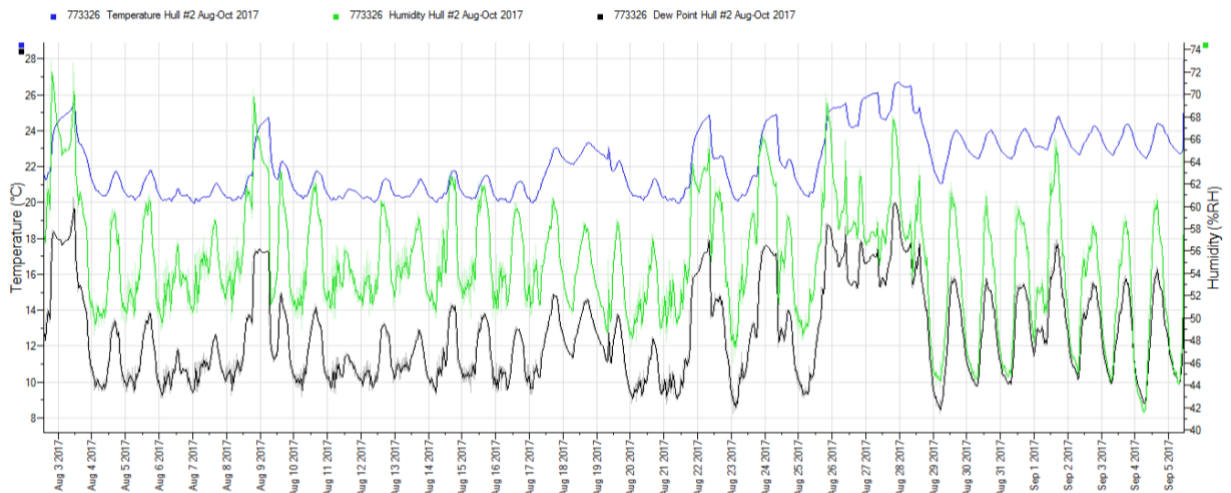


### Hull #2 – May to August 2017





### Hull #2 – August to September 2017

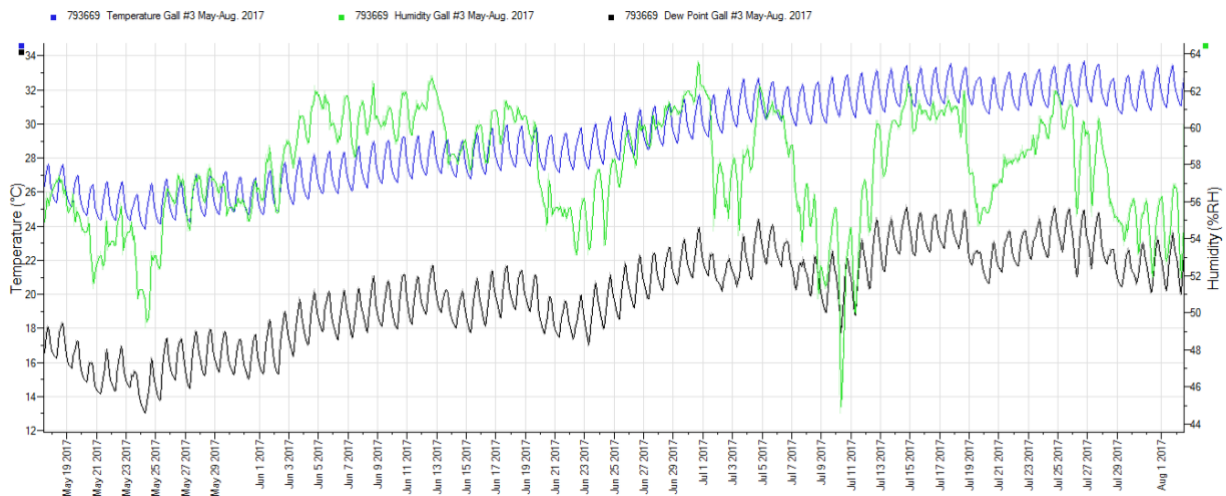


**Figs.5-8: Graphs tracing the temperature, relative humidity and dew point in the Ship Gallery between May and August and August and September (Graphs generated by TinyTag software, 2017).**

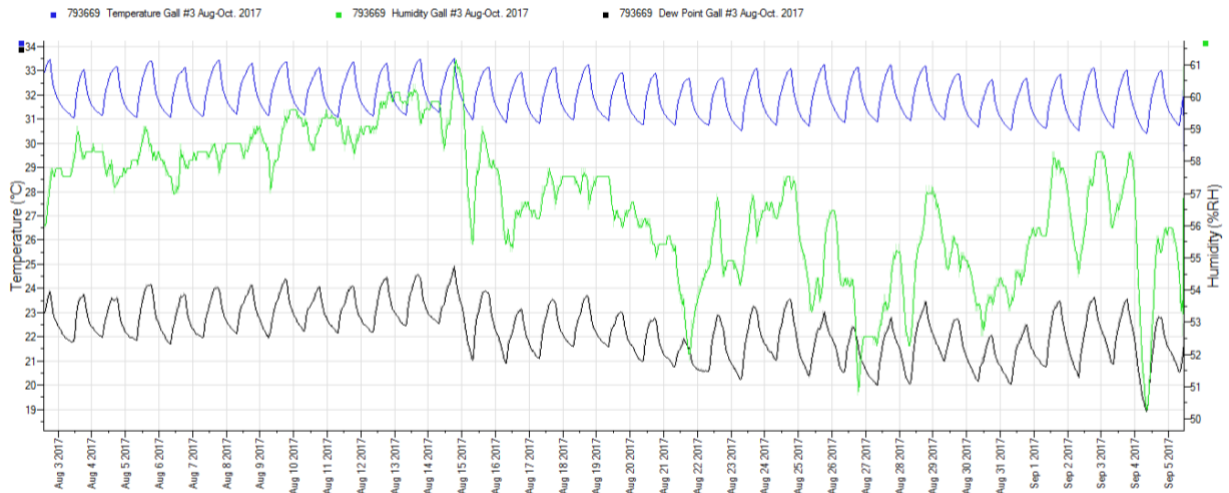
In the Museum Gallery, temperature demonstrated a daily fluctuation, probably corresponding to a temperature increase when the lights in the display cases were on. In addition, there is a gradual rise in temperature as the temperature rises outside. During this period temperature ranged between 23.8°C and 33.7°C. The logger 'Gallery #3' (in the case with lead brail rings) recorded slightly higher temperatures than 'Gallery #4' (in the case with the lead curse tablet) in general, with an average of around 0.8-1°C higher.

The relative humidity recorded in both instances fluctuates considerably and more irregularly when compared with the loggers in the Ship gallery. Both recorders suggesting a similar pattern, which most likely corresponds to a rise and fall in the external environment, with both loggers recording a great drop in relative humidity around July 10<sup>th</sup>. Overall, 'Gallery #3' showed a smaller range of relative humidity of 44.5% - 63.6%, whereas 'Gallery #4' recorded a range of 42.0% - 70.8%. 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.

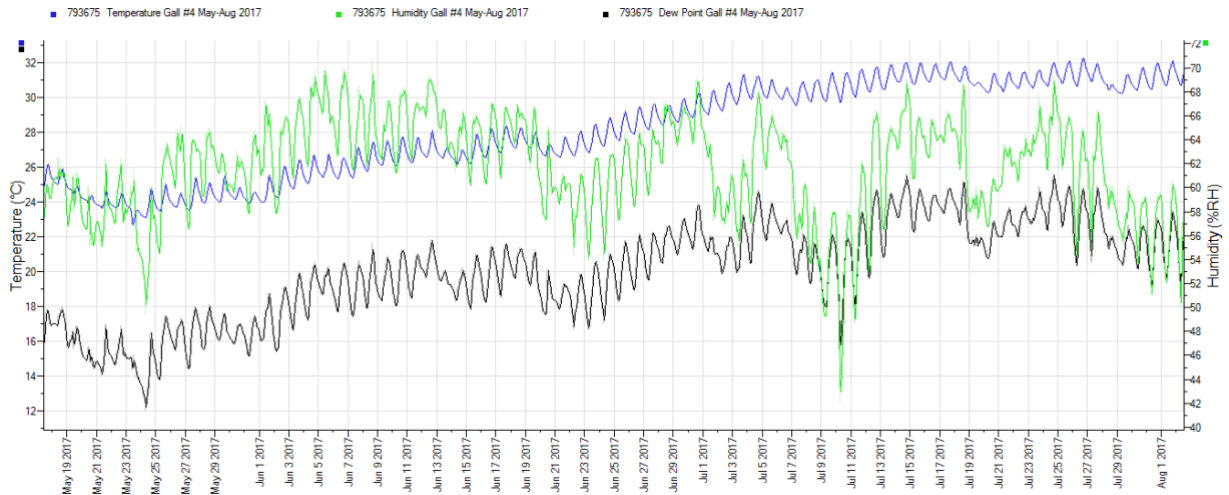
### Gallery #3 – May to August 2017



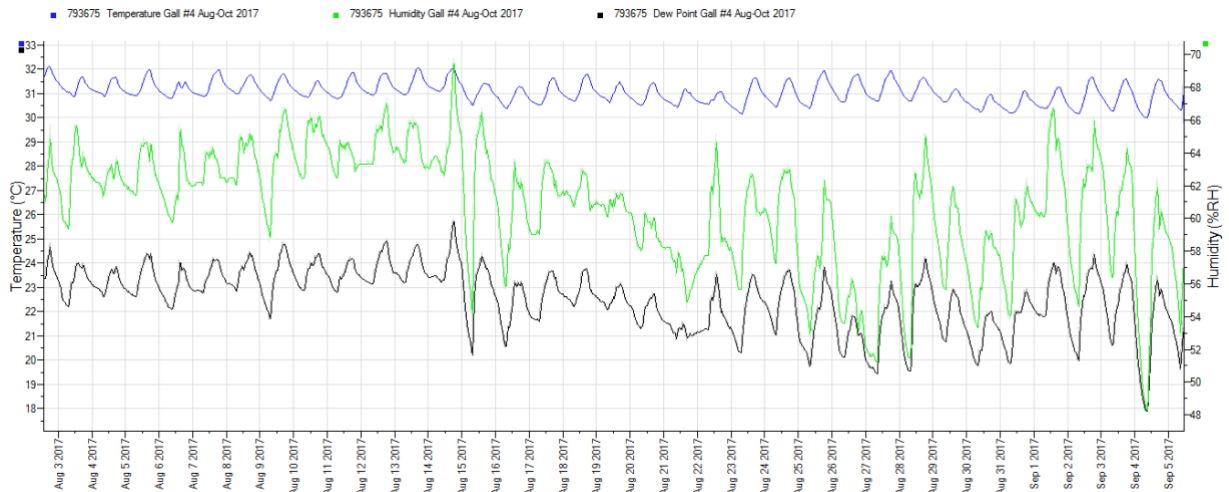
### Gallery #3 – August to September 2017



### Gallery #4 – May to August 2017



### Gallery #4 – August to September 2017



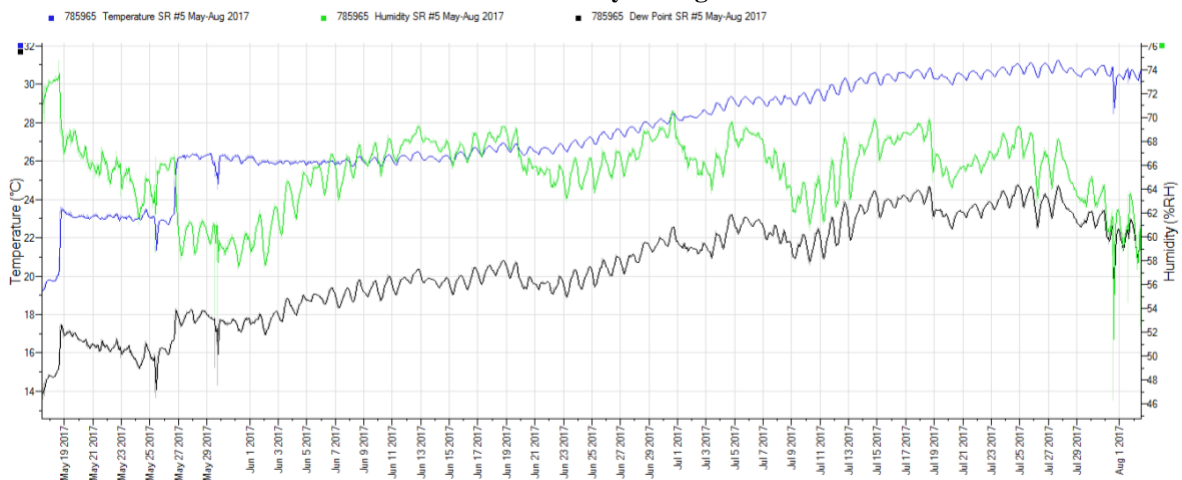
**Figs.9-12: Graphs tracing the temperature, relative humidity and dew point in the Museum Gallery between May and August and August and September (Graphs generated by TinyTag software, 2017).**

In the Kyrenia Ship Storeroom, the fluctuating temperature is mostly down to the fact that the conservators were experimenting with different settings of the air conditioning unit to see which would provide the Storeroom with the most stable environment, with a humidity not exceeding 65-70%. The air

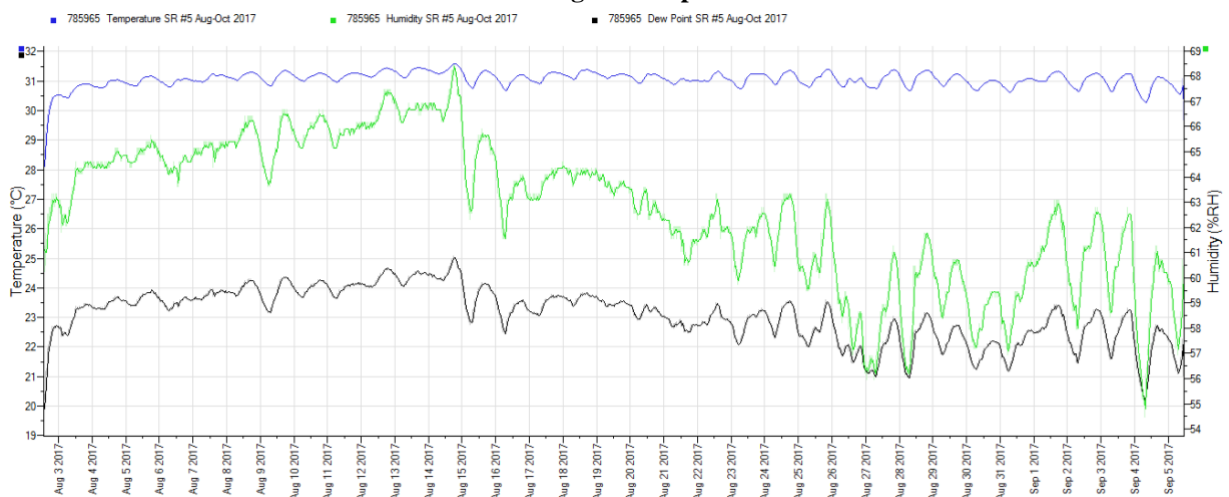
conditioner was later set to 27°C towards the end of May, after which it becomes more stable, increasing slightly towards the end of August as it becomes hotter outside. Occasional dips in temperature may be due to instances where the air conditioner was switched off in order to provide a better working environment, or due to periods of power outage.

In terms of relative humidity, the Storeroom followed a similar pattern of fluctuations as seen in the Museum Gallery, again likely due to external conditions. However, in this case, relative humidity fluctuated less, buffered probably by the action of the air conditioner. Relative humidity ranged between 46.2% and 74.8% in 'Storeroom #5' and 49.3% and 73.0% in 'Storeroom #6'. In general, less fluctuations were recorded by 'Storeroom #6', this is likely because this logger is in a metal cabinet and not on open shelves and therefore suggests that the objects in the cupboards are better protected from the external environment.

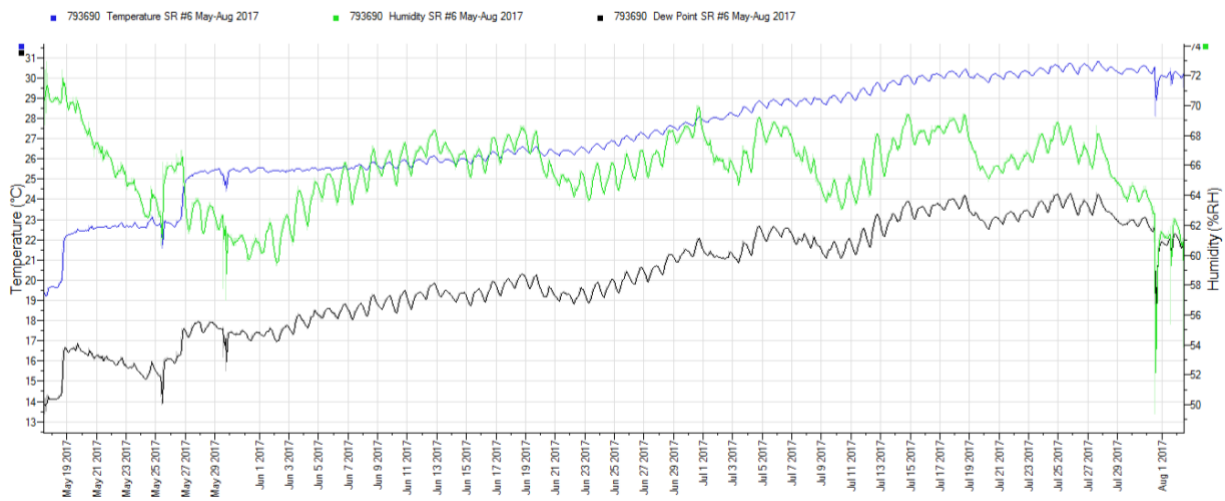
### Storeroom #5 – May to August 2017



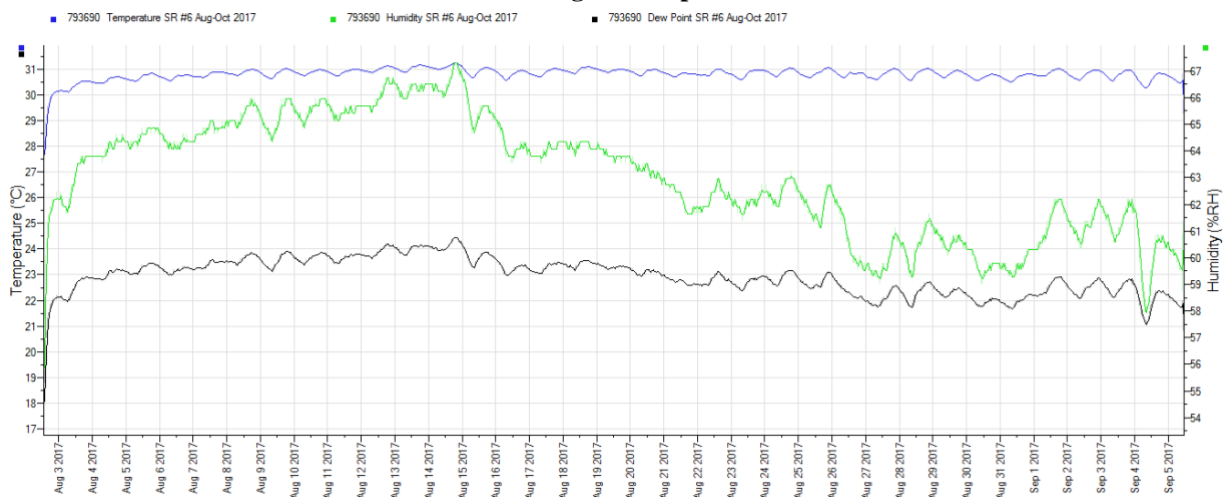
### Storeroom #5 – August to September 2017



### Storeroom #6 – May to August 2017



### Storeroom #6 – August to September 2017



**Figs.13-16: Graphs tracing the temperature, relative humidity and dew point in the Store Room between May and August and August and September (Graphs generated by TinyTag software, 2017).**

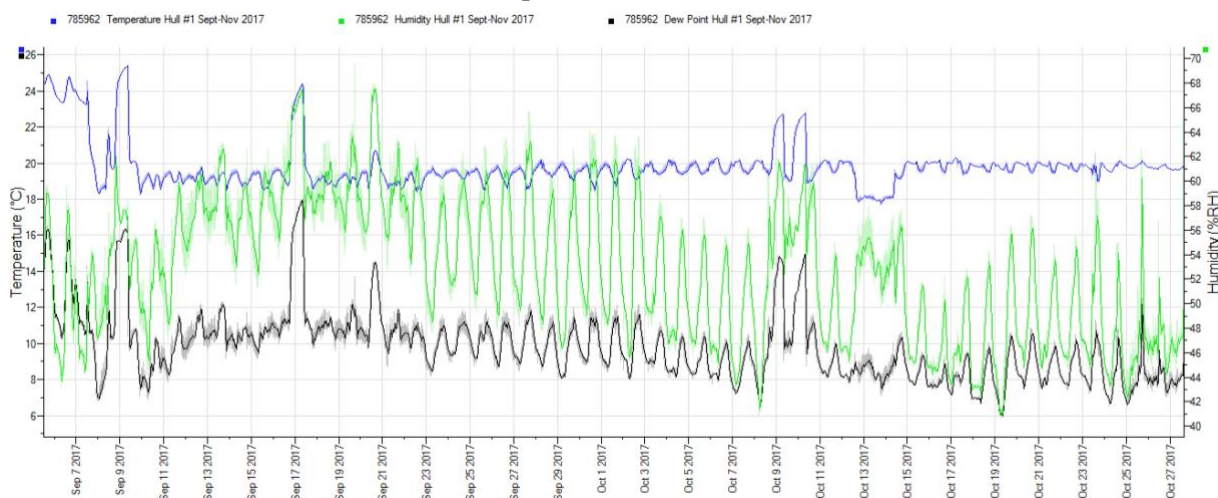
### September to October 2017

During September to October external temperatures begin to reduce as Autumn approaches. Logging ran between September 5th and October 27th, with all 6 loggers recording data every 7 minutes.

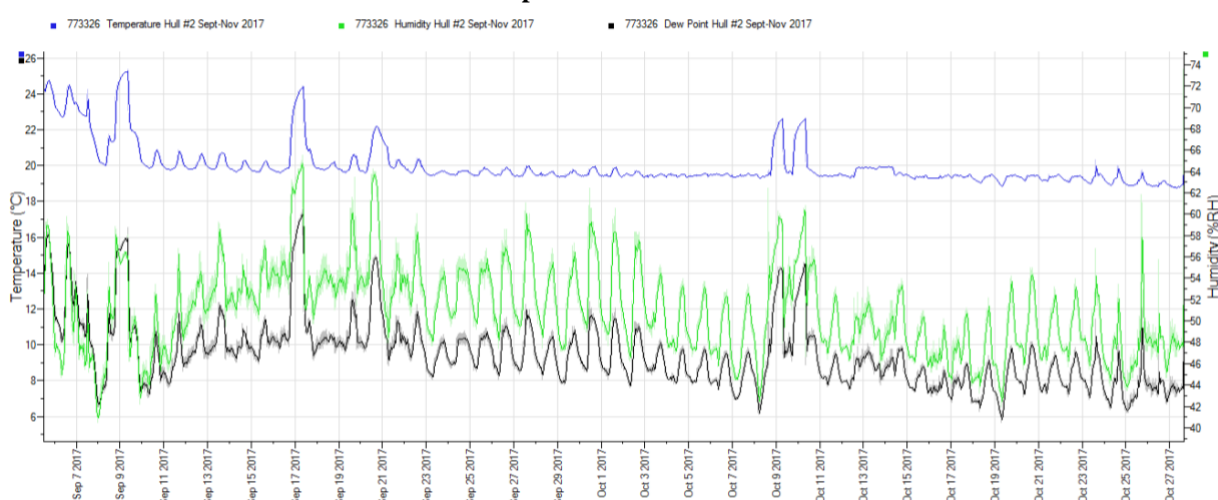
In the Ship Gallery, temperature again remained relatively stable, ranging between 17.6°C and 25.5°C, again largely due to the air conditioner. As seen previously, logger 'Hull #2' recorded a slightly higher average temperature at 20.0°C versus 'Hull #1' where the average reading was 19.8°C. Again, this may well be due to the location of 'Hull #1' near the air conditioner.

Again, as was the case in May to September, greater fluctuation is evident in the relative humidity recorded by both loggers. 'Hull #2' again demonstrates the greater degree of fluctuation. Over the whole gallery, relative humidity recorded varied between 40.4% - 73.6%. Again, this is not ideal but changes tend to be slow and occur over hours, rather than dramatic rapid fluctuations. Compared to May to August there is also a slightly lower average relative humidity which may be connected to seasonal change.

### Hull #1 – September to October 2017



### Hull #2 – September to October 2017

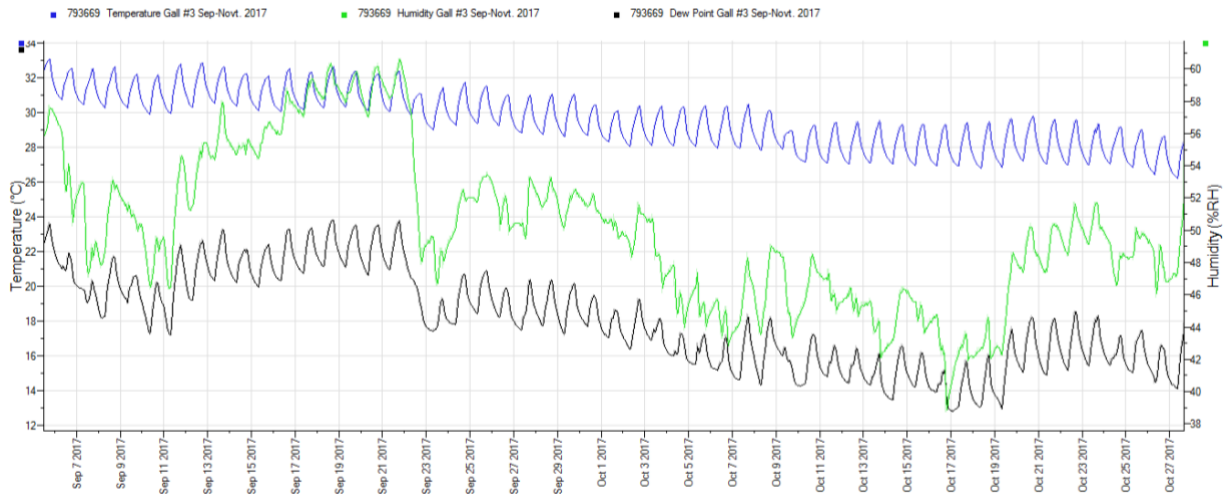


**Figs.17-18: Graphs tracing the temperature, relative humidity and dew point in the Ship Gallery between September and October (Graphs generated by TinyTag software, 2017).**

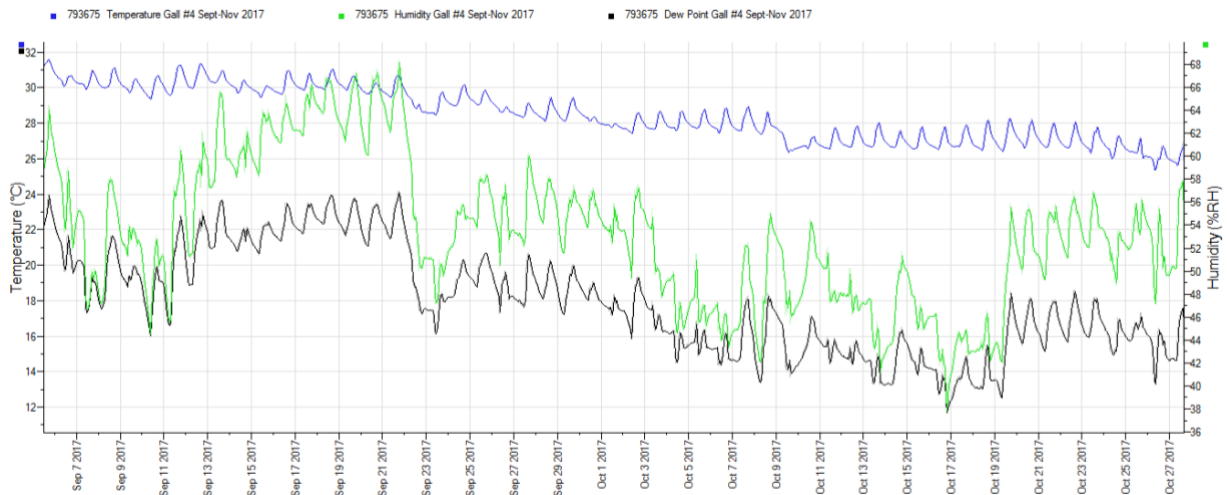
In the Museum Gallery, temperature continued to demonstrate a daily fluctuation, again likely corresponding to a temperature increase when the lights in the display cases were on. In addition, there is a gradual decrease in temperature as the temperature begins to drop outside with the onset of Autumn. During this period temperature ranged between 25.3°C and 33.1°C. Again, the logger 'Gallery #3' (in the case with lead brail rings) recorded slightly higher temperatures than 'Gallery #4' (in the case with the lead curse tablet) in general, with an average of 1.1°C higher.

As was the case in May to September, the relative humidity appears to correspond to external fluctuations, with an overall downward trend as Autumn progresses. Overall, 'Gallery #3' again showed a narrower range of relative humidity of 38.7% to 60.7%, whereas 'Gallery #4' recorded a greater range of 37.5% to 68.4%. Again, this suggests the case containing 'Gallery 4' is less well-buffered from the external environment. It therefore may be worth considering relocating the lead curse table to another display case and replacing it with something less vulnerable to environmental conditions. However, if this was to take place a better buffered case would need to be identified through long-term monitoring.

### Museum Gallery #3 – September to October 2017



### Museum Gallery #4 – September to October 2017

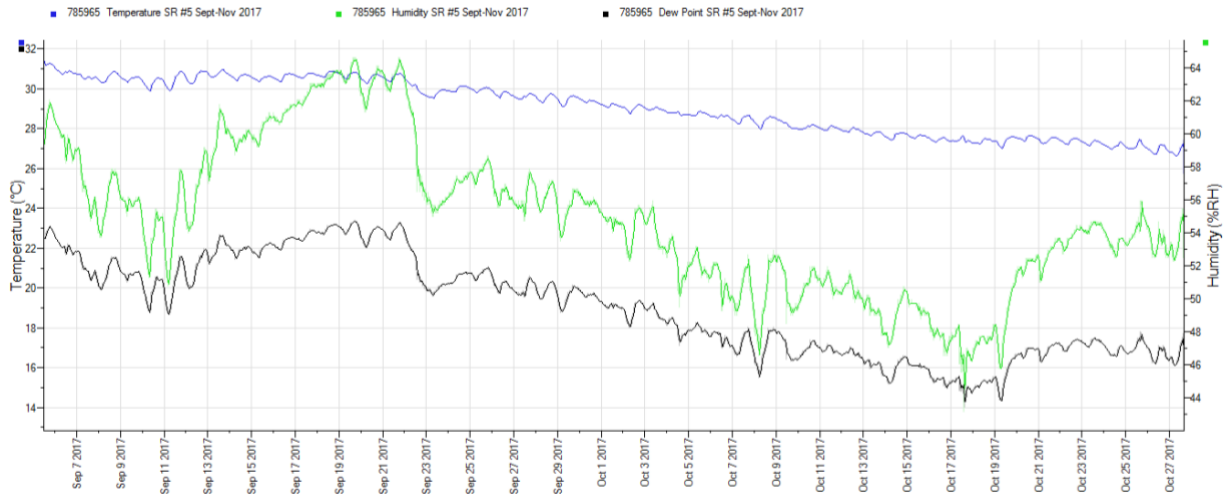


**Figs.19-20: Graphs tracing the temperature, relative humidity and dew point in the Museum Gallery between September and October (Graphs generated by TinyTag software, 2017).**

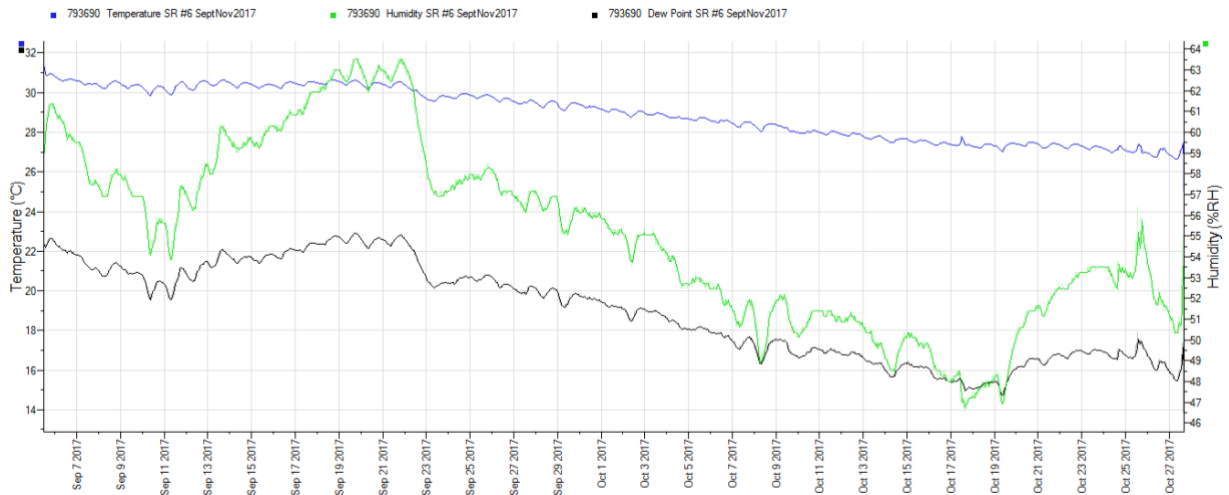
In the Kyrenia Ship Storeroom, temperature became more stable between September and October, largely due to the presence of the air conditioner. Again, the temperature gradually decreases as Autumn progresses and external temperatures drop.

In terms of relative humidity, the Storeroom continued to follow the pattern of rises and drops evident in the Museum Gallery, again likely due to external conditions. The air-conditioned environment appears to have continued to have a buffering effect, reducing the extremes in relative humidity during the Autumn. The 'Storeroom #5' relative humidity ranged between 43.6% and 64.6% and 'Storeroom #6' ranged between 46.4% and 63.5%. Again, there were less fluctuations recorded by 'Storeroom #6', further implying that the metal cabinet has a buffering effect on the internal environment.

### Storeroom #5 – September to October 2017



### Storeroom #6 – September to October 2017



**Figs.21-22: Graphs tracing the temperature, relative humidity and dew point in the Storeroom between September and October (Graphs generated by TinyTag software, 2017).**

## Future Plans

To ensure the continued preservation of the collection, it is important that environmental monitoring, condition checks and maintenance continues. At the end of the conservation project a document was created by the conservators called 'Recommendations for Future Care and Maintenance' detailing the preservation recommendations and priorities. In it, it is suggested that the collection is assessed every 6 months. During the visit in October this document was printed and placed in the Storeroom so that it is available for anyone assessing the collection in the future. A digital copy was also made available to Kyrenia Castle staff.