

# Characterization of glass plate packaging system: old vs. new

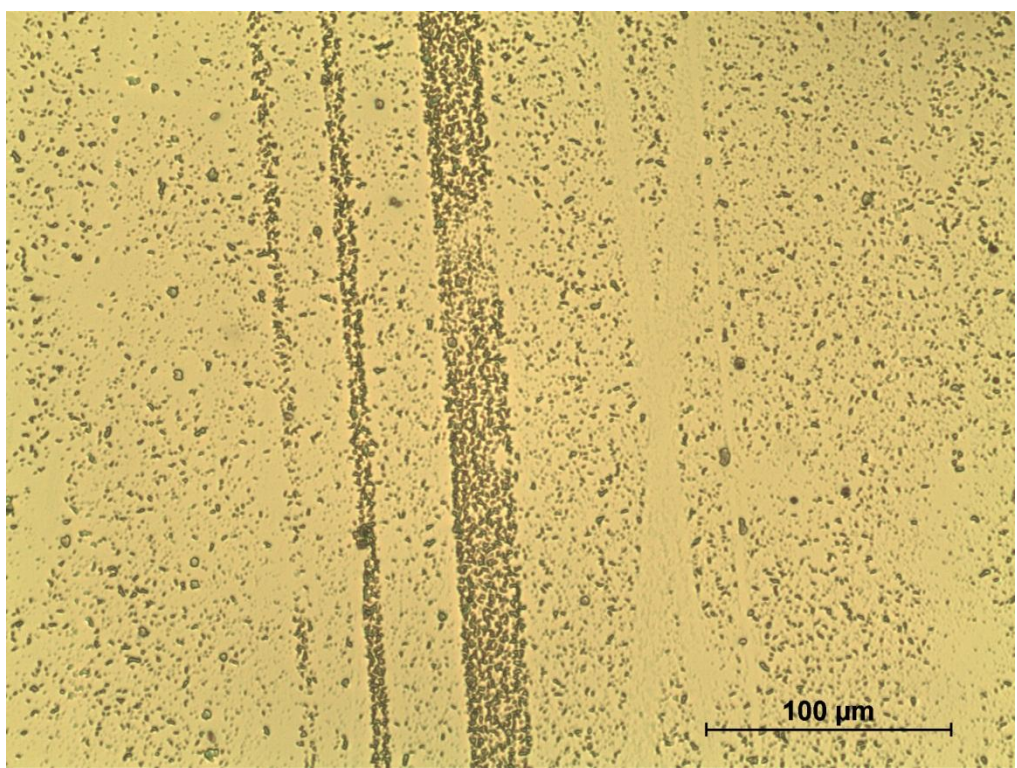
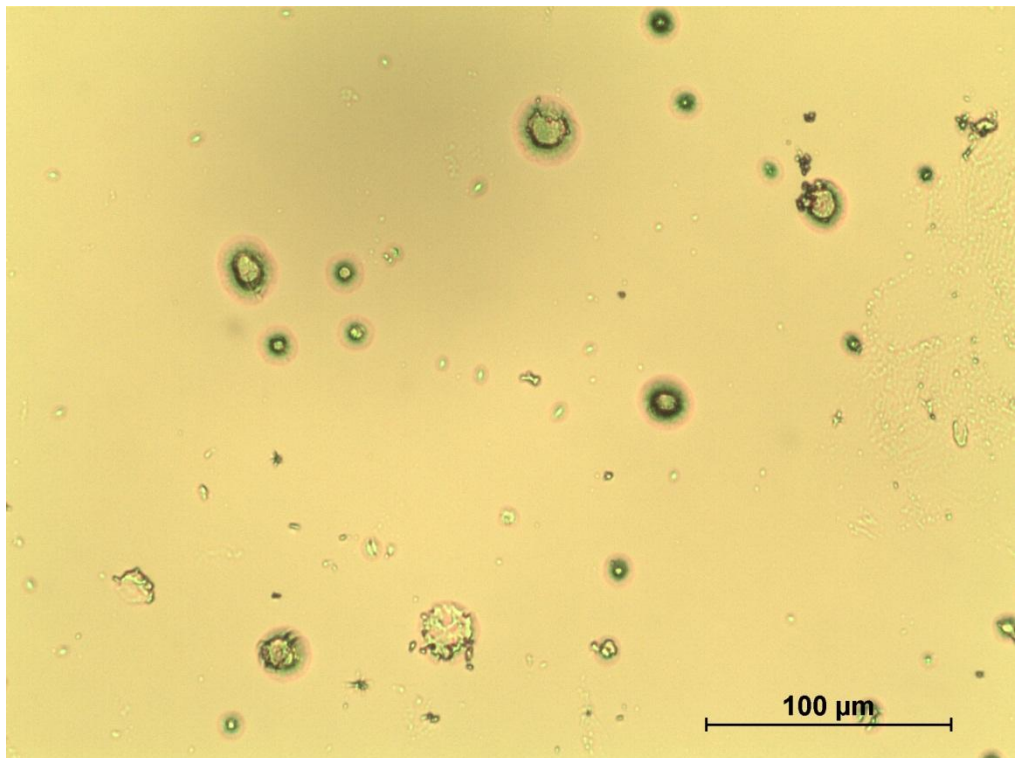
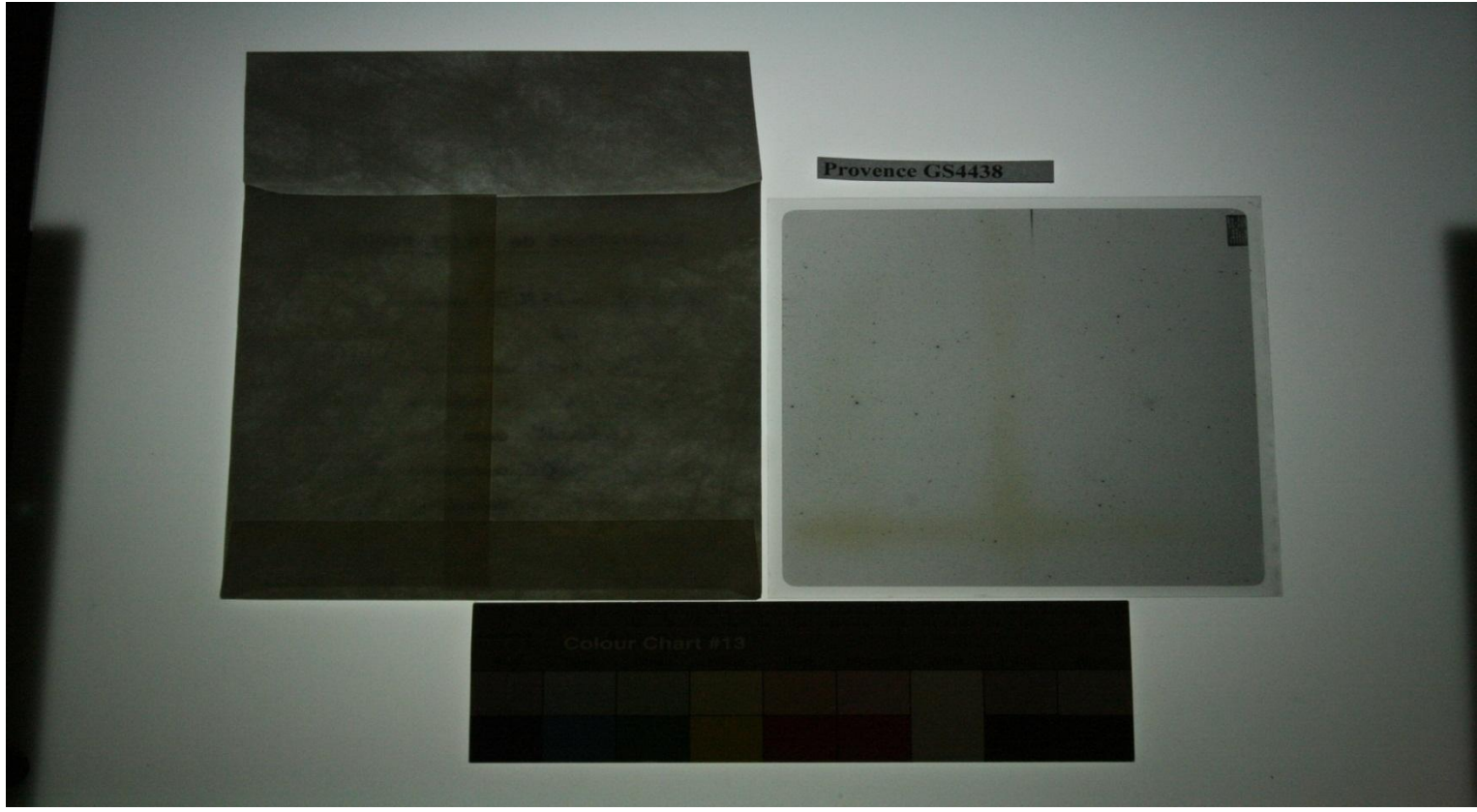
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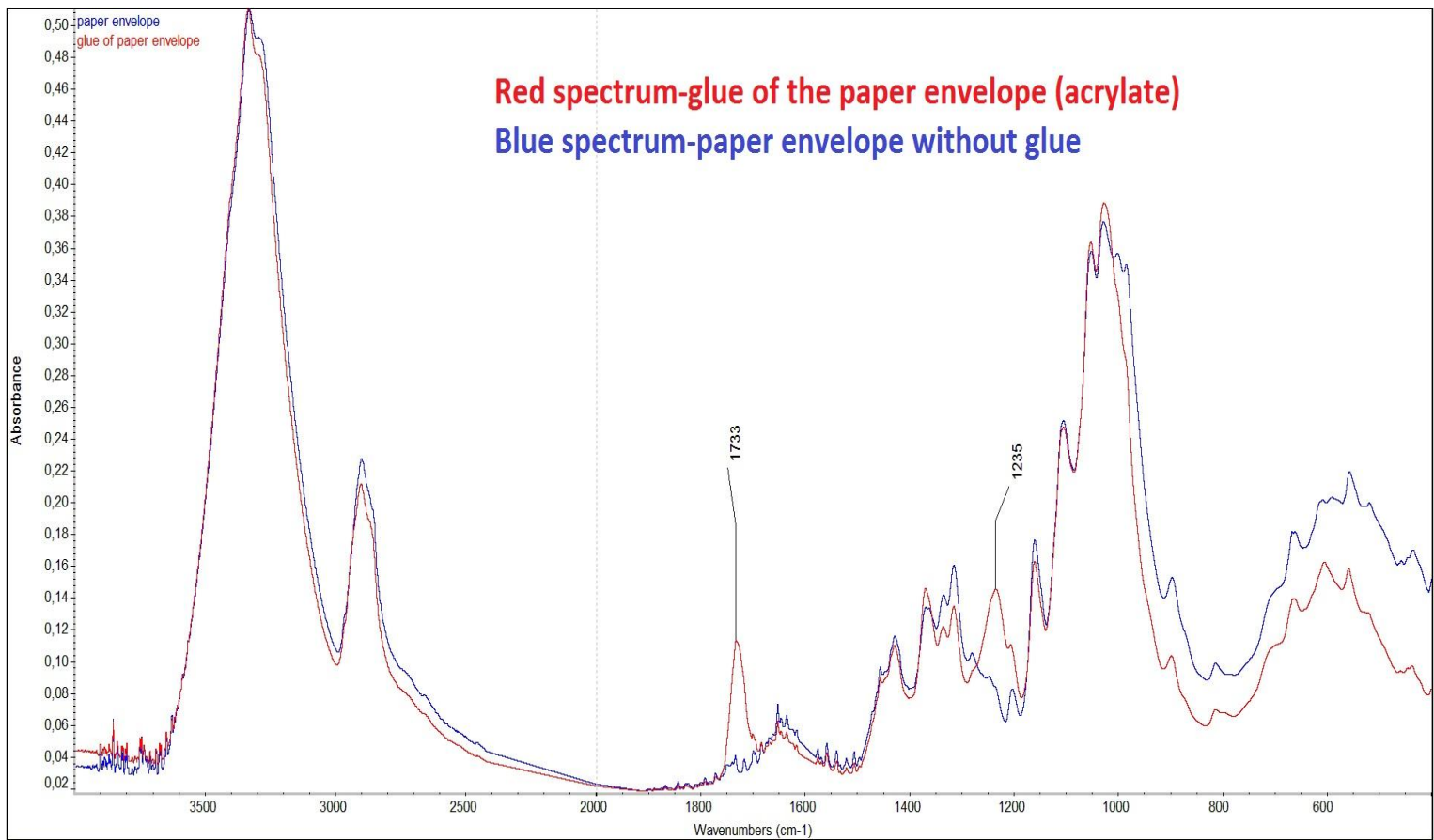
## Abstract:

During our collaboration with Rene Hudec, we examined various types of glass plate negatives. Some types of glass plate negatives deterioration were caused by selecting of non-suitable materials for long time storage. This poster summarizes investigation of currently used packaging systems. By using chemical analytical techniques (Fourier Transformed Infrared Spectroscopy-FTIR and pH measurement) we discovered that some observatories use old acid paper types and some of them use new paper types with alkali reserve. But new paper types are glued with non suitable adhesives which may deteriorate the glass of the plates. Also currently used non-porous plastic bags may cause degradation of negatives in case of storage in improper conditions. This study is aimed to inform about hidden potential hazard to badly stored data on glass plate negatives and make some recommendations that lead to better preservation of these data.

## Glued envelopes



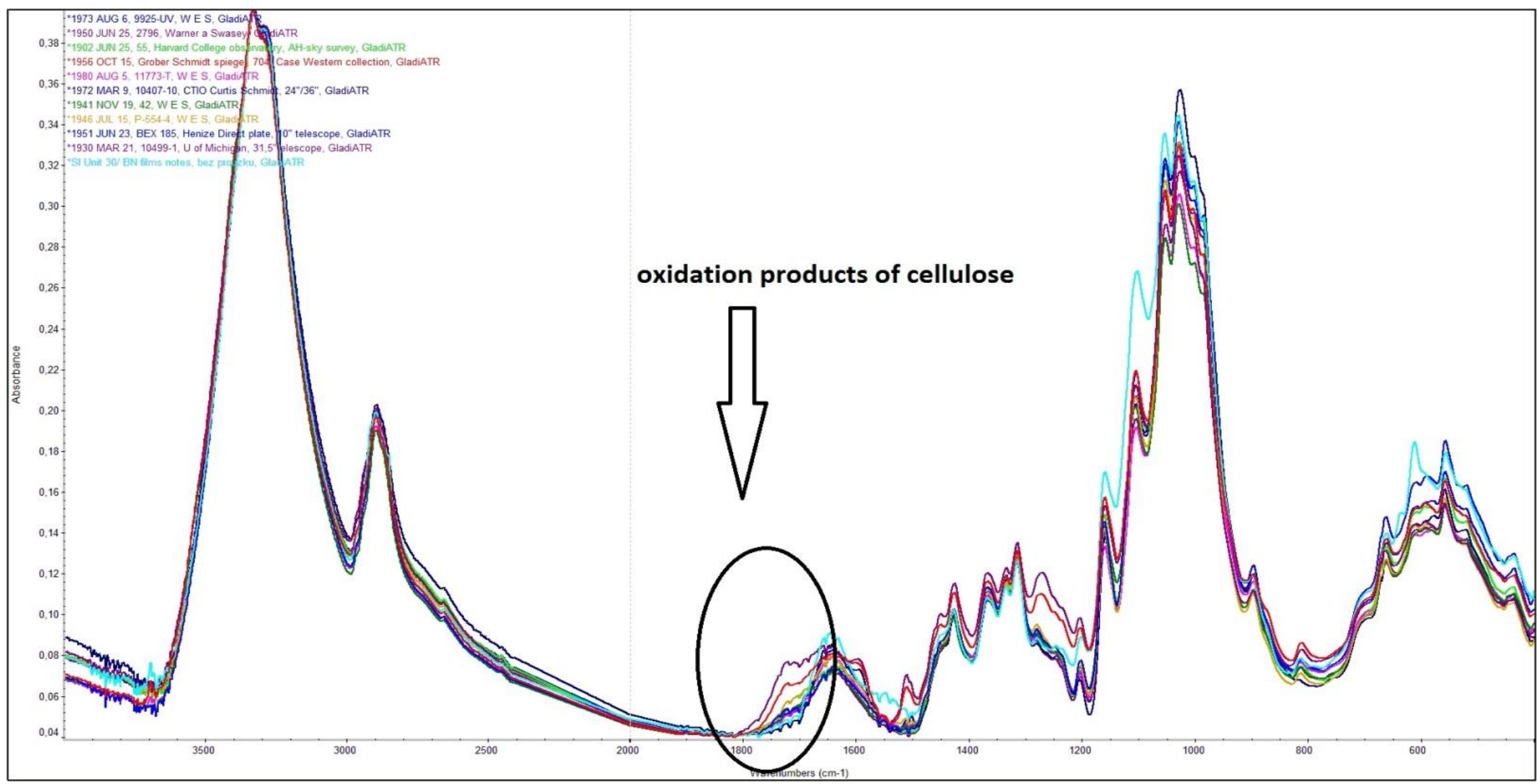
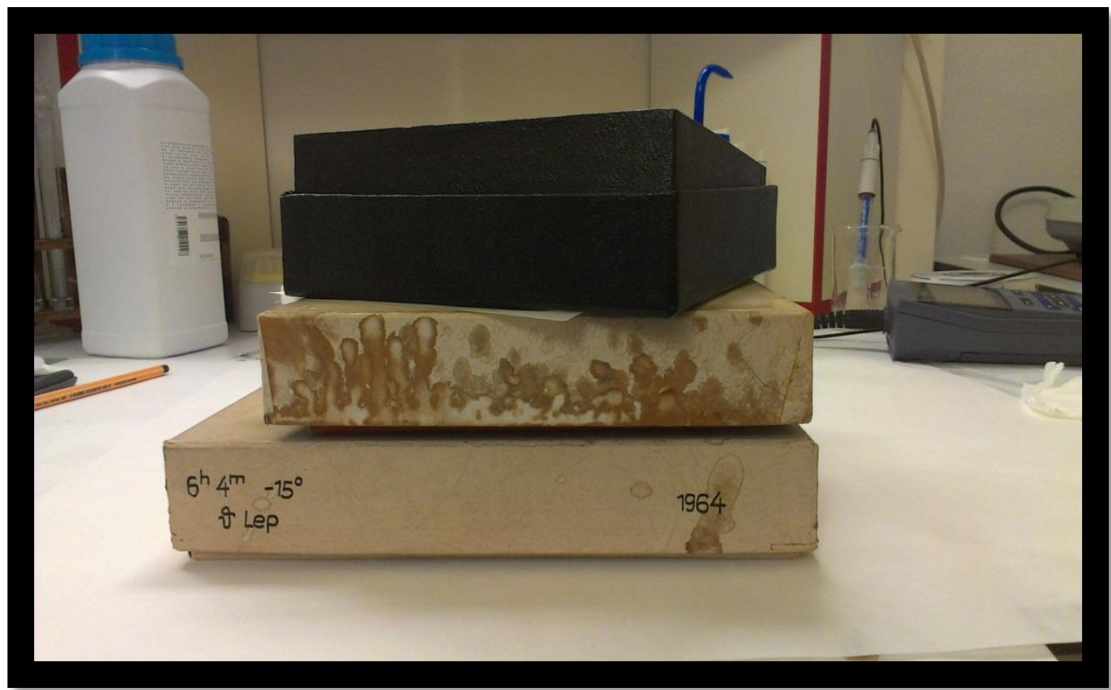
Microscopic documentation of glass deterioration in the place of yellow glass corrosion



Infrared analysis of the glue on an envelope of negative – used glue was of an acrylate origin that contributes to degradation of glass plates

## Old packaging

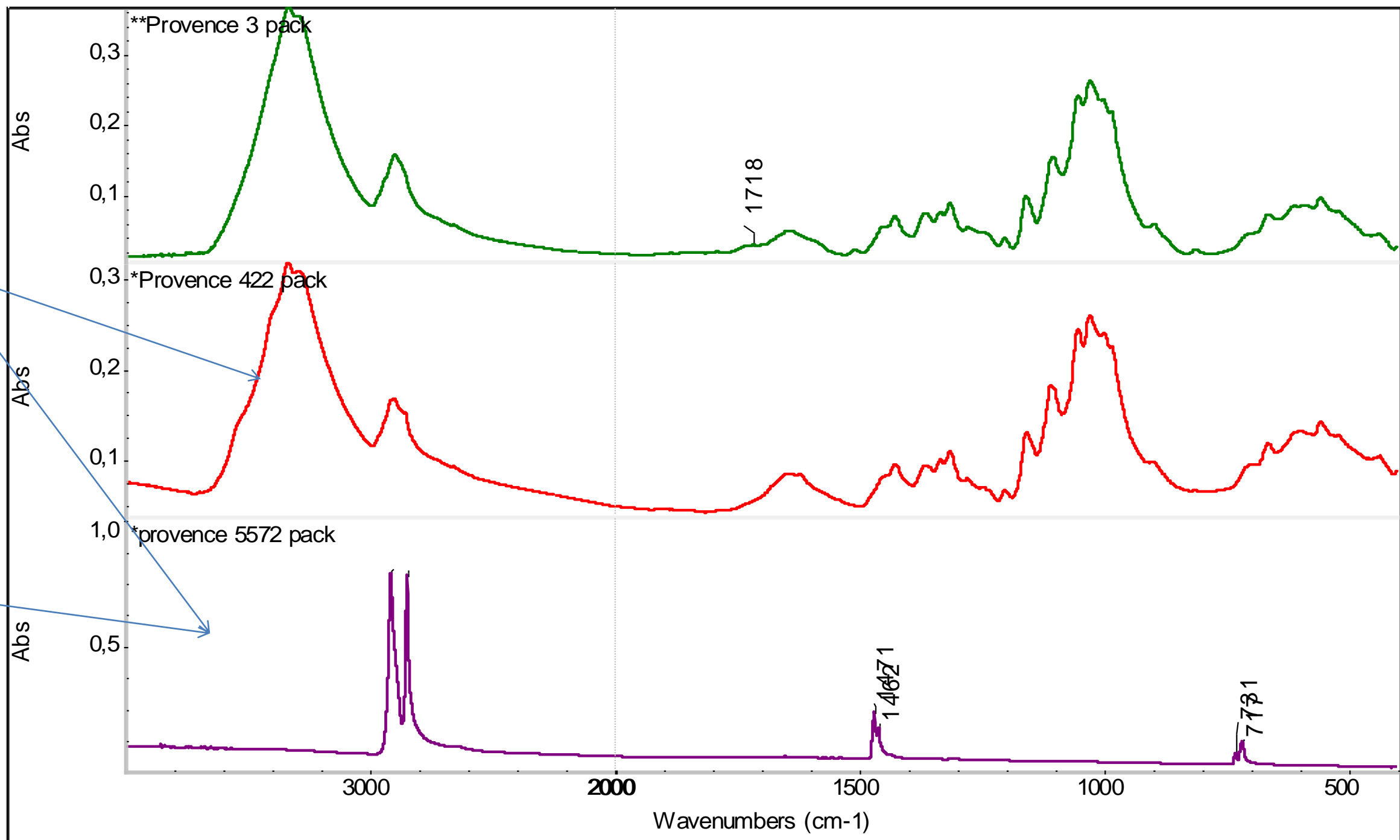
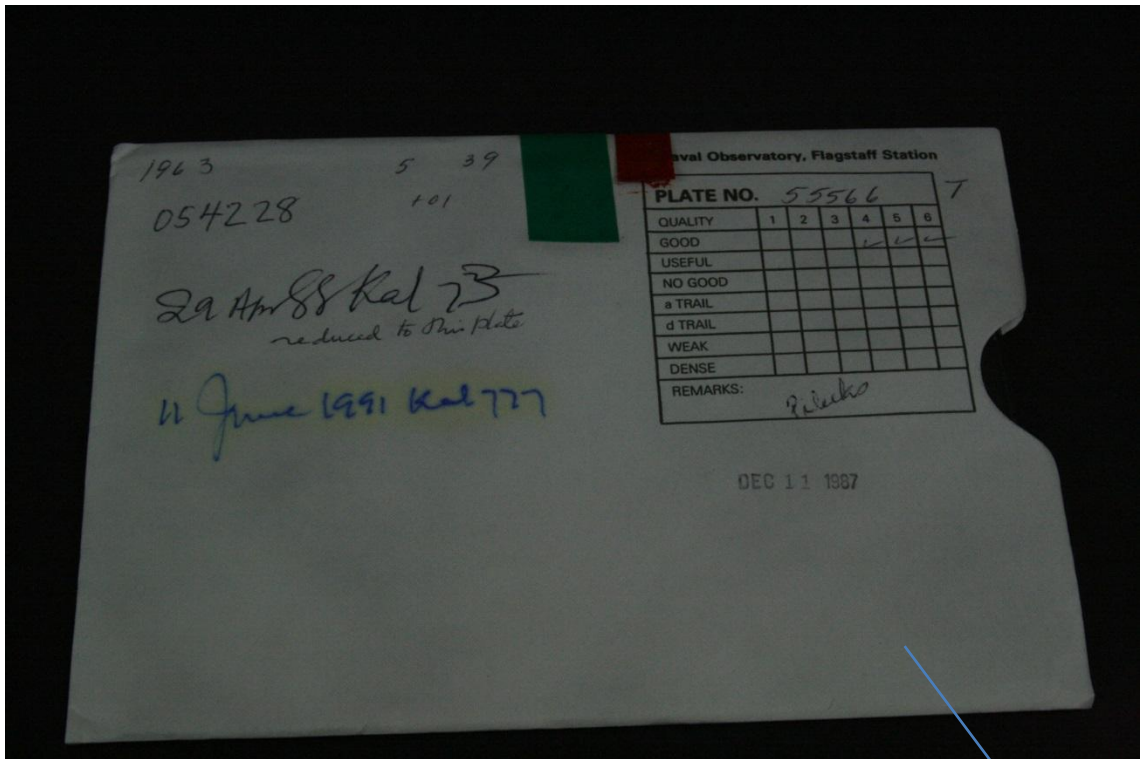
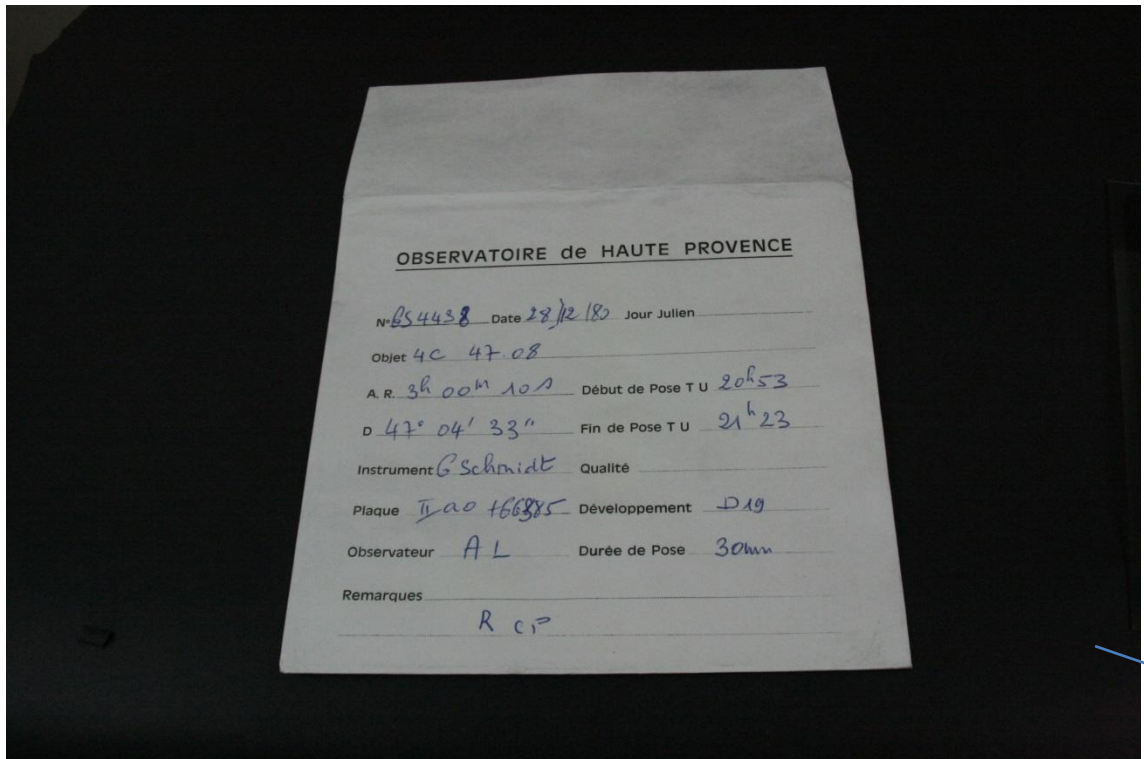
FTIR analysis of papers – identification of cellulose oxidation products



1950 Jun 25, #2796, Warner Swasey	4,02
1973 Aug 6, # 9925-UV, W&S	4,33
1956 Oct 15, #704, Grober Schmidtspiegel	3,40
1902 Jun 25, #55, Harvard College Observatory, All sky survey	3,89
1972 Mar 9, #10407-10, CTIO , Curtis Schmidt 24"/36"	4,46
1980 Aug 5, #11773-T, W&S	4,02
1941 Nov 19, #42, W&S	3,56
1946 Jul 15, #p-554-4, W&S	3,69
1951 Jun 23, # BEX 185, Meinze Direct Plate 10" telescope	4,05
1930 Mar 21, #10499-1, V of Michigan 37,5" telescope	2,56
SI. Unit 30/BN films note – line paper	4,36
SI. Unit 30/BN films note – Agfa	4,26
SI. Unit 30/BN films note - tape	5,33

## Identification of packaging material types – IR spectroscopy

Various types of envelopes of negatives identified by infrared spectroscopy



## Recommendation:

- Long storage in depositaries with controlled conditions, e.g. stable temperature and relative humidity ( $20 \pm 2^\circ\text{C}$ ,  $50 \pm 5\%$  RH)
- Store plates separately packaged in non-glued and non-acid types of paper – using papers with alkali reserve is probably also possible but nobody have done the study of long term influence of acid free papers
- Vertical, not horizontal, storage
- No syntetic polymer envelopes