

*Abstract Book*

OF

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VITERBO, ITALY

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**SETTE CITTÀ**

are needed in order to understand the ecophysiological mechanism.

## First dendrochronological results from the Bronze Age salt mine at Hallstatt, Austria

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The prehistoric salt mine Hallstatt together with its burial ground is the most prominent archaeological site in Austria – the name also standing for the Hallstatt period (800 to 400 BC). Due to the perfect conservation with rock salt a great number of organic material, primarily wooden artefacts, have been found. First dendrochronological attempts go back to Hollstein (1974), twenty years later followed by Ruoff and Sormaz who have crossdated some wooden artefacts and assigned them to the Hallstatt and Roman period.

Currently, the major archaeological focus lays on the early periods of salt mining in that area, which is the Bronze Age. Excavations have taken place for the past 14 years at the *Christian von Tusch Werk, alter Grubenoffen*. This area was influenced by recent mining activities during the 18<sup>th</sup> century AD. Sampling activities have yielded 497 mine timbers so far, including the discovery of the world's oldest wooden staircase. All wooden artefacts were sampled, and carefully measured. The spectrum of the wooden species comprises 47% Norway spruce, 43% Silver fir, 8% beech and 1% for European larch and maple each. As far as dendrochronology is concerned it was possible to cross-date 200

samples so far, which resulted in a 282 years long mean-chronology. This floating chronology includes spruce, fir and beech wood samples with the staircase samples placed in the middle of this chronology, ending at the ring number position 183. The clustering of wooden artefact types within this mean chronology is an important source of information for the archaeologists about construction phases and time usage.


The forest sites where the wood logs used in the prehistoric salt mine were harvested are located between 900 m asl and 1500 m asl. Reference chronologies as they currently exist are still in a preliminary state and need to be further improved and cross-checked. Most Bronze Age chronologies currently existing are established either at lower elevations, e.g. at lake settlements (Sormaz, Billamboz); or at much higher elevations (Nicolussi, Schmidhalter). The most promising reference chronology already available originate from the Dachstein plateau, close to Hallstatt, and this composite chronology include spruce/larch series that are highly climate-sensitive. Currently, a first preliminary dating of the floating chronology using the Dachstein reference chronology suggests 1245 BC for the last tree-ring. This dating has to be approved by sub fossil logs originating from a bog at Hallstatt.

## Seasonal dynamics of secondary phloem growth ring formation in Norway spruce (*Picea abies*) and silver fir (*Abies alba*)

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To examine seasonal dynamics of secondary phloem growth ring formation in Norway spruce (*Picea abies*) and silver fir (*Abies alba*) weekly sampling of intact tissue was performed from the end of April until the middle of November in the year 2003.

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 The Bronze age salt mine at Hallstatt

**HALLSTATT**  
DACHSTEIN  
SAIZKAMMERGUT




The burial ground

 The Bronze age salt mine at Hallstatt

Mining activities      Burial ground


Pick-axe  
made of a  
deer antler



Hallstatt  
period

Neolithic period      Bronze age      Iron age      Roman period

5000 BC      4000 BC      3000 BC      2000 BC      1000 BC      0

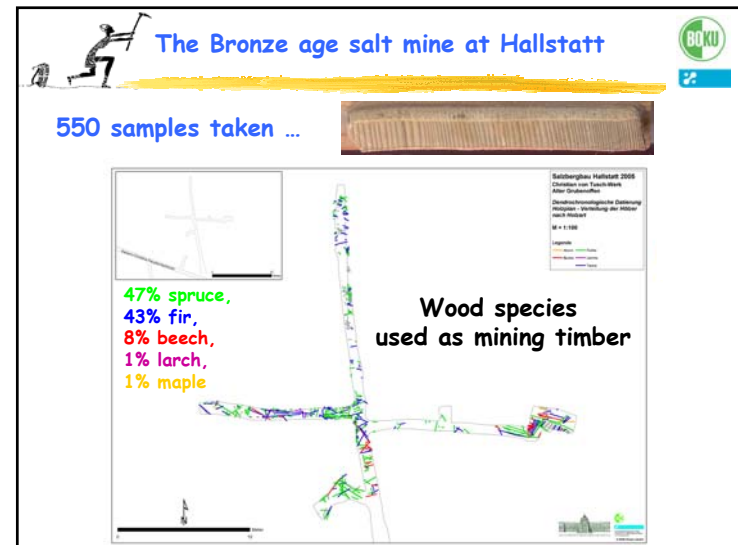
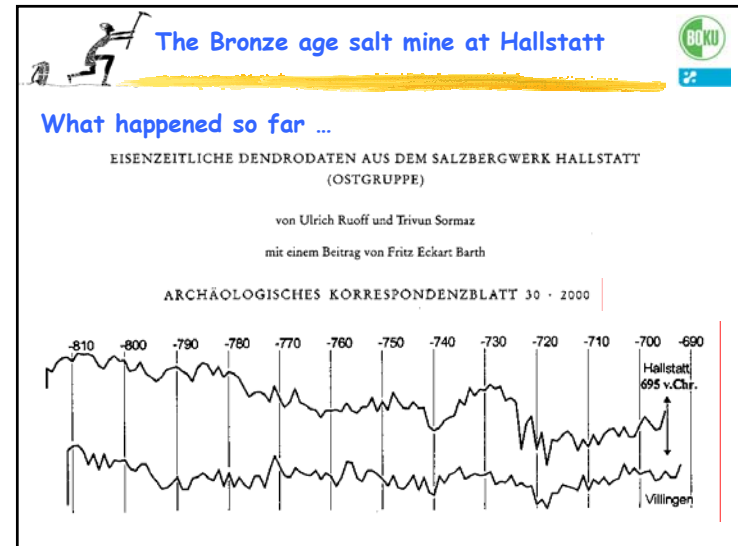
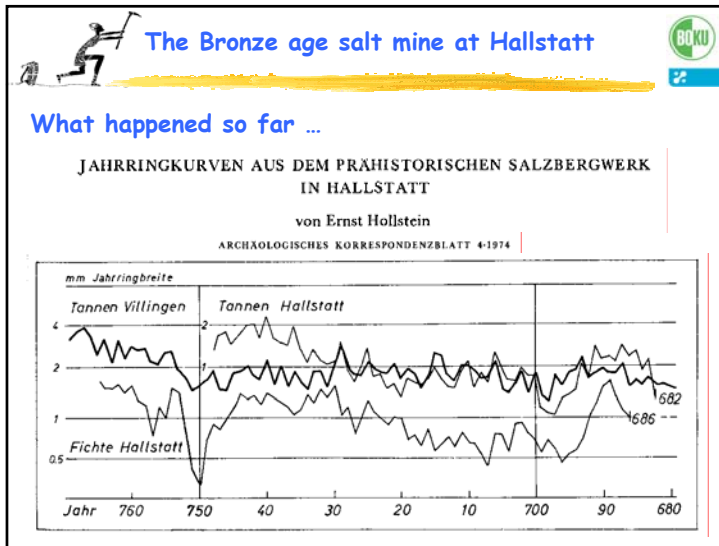
 The Bronze age salt mine at Hallstatt

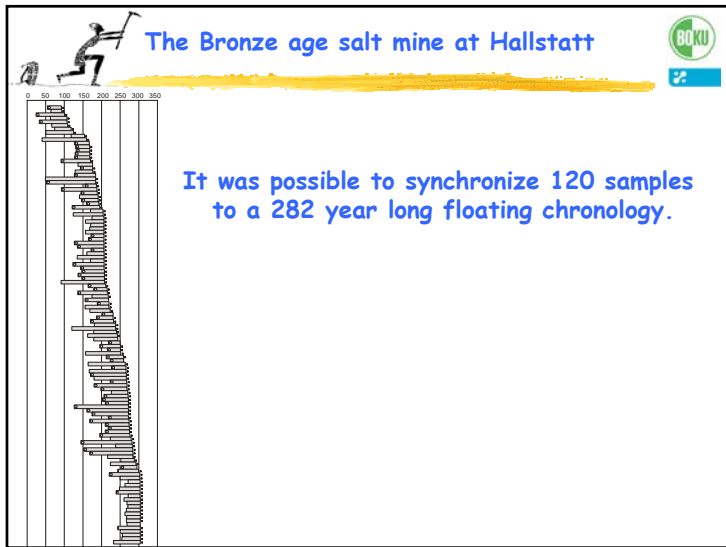
Hallstatt located at  
the northern limestone-alps

The "high valley"

Entrance  
of the prehistoric tunnels:  
1000 m a.s.l.





The Bronze age salt mine at Hallstatt

The reference-chronology: 1498 BC to 2003 AD

Karmoos, 2004

Dachstein, presented in Davos 2001

