



Combined dendrochronological and radiocarbon dating of three Russian icons from the 15th–17th century[☆]



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ARTICLE INFO

Article history:

Received 10 June 2015

Received in revised form 9 October 2015

Accepted 12 October 2015

Available online 30 October 2015

Keywords:

Icons

Wiggle-matching

Wood dating

Radiocarbon dating

Russia

Wood painting

Cultural heritage

ABSTRACT

Dendrochronology is usually the only method of precise dating of unsigned art objects made on or of wood. It has a long history of application in Europe, however in Russia such an approach is still at an infant stage, despite its cultural importance. Here we present the results of dendrochronological and radiocarbon accelerated mass spectrometry (AMS) dating of three medieval icons from the 15th–17th century that originate from the North of European Russia and are painted on wooden panels made from Scots pines. For each icon the wooden panels were dendrochronologically studied and five to six AMS dates were made. Two icons were successfully dendro-dated whereas one failed to be reliably cross-dated with the existing master tree-ring chronologies, but was dated by radiocarbon wiggle-matching. Wiggle-matching of radiocarbon dates is the most promising method for dating Russian icons in the absence of a dense dendrochronological network. However, for this case uncertainties connected with the radiocarbon method have to be taken into account and further studies of these uncertainties must be undertaken by comparing dendro-dated and radiocarbon-dated wooden works of art. Our results, moreover, showed that in two cases art-historical dates were by five to ten decades older than the earliest possible time of the creation of the icons, based on dendrochronology.

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1. Introduction

Dendrochronological dating is usually the only method of precisely dating unsigned art objects made on or of wood. Whereas numerous studies are dedicated to this topic in Europe (e.g., [Bauch and Eckstein, 1970](#); [Lavie and Lambert, 1996](#); [Kuniholm, 2000](#); [Wazny, 2002](#)), there are quite few of them in Russia (here we take only the European part of the country). In Eastern Europe several works were carried out on radiocarbon dating ([Kovalyukh et al., 2001](#)) and on dendrochronological dating ([Krąpiec and Barniak, 2007](#)) of icons painted between the 12th and 19th century.

Up to now, medieval Russian icons were mostly studied by art historians and chemistry technologists, but they usually date these objects on the basis of an empirical relative chronology. This chronology is based on several historically dated Russian icons. Usually it is not possible to define a precise date of creation of historically undated icons on the base of such chronologies. Time intervals for these dates are usually twenty to thirty years wide.

In Russia previously only one art object has been dated dendrochronologically—it was a Dexiokratusa icon from Velikiy Novgorod ([Voronin et al., 2015](#)). There are two main reasons for this poor state of such research: (1) sparse dendrochronological network mainly representing coniferous species (mainly pine and spruce) and (2) problems with getting permission for the analyses of art objects in museums and galleries.

The three icons—“Mother of God with the Child, Jerusalem type” (MOG), “St. Nicholas of Myra in Lycia with scenes of his life” (NIC) and “St. George and the Dragon miracle” (GEO) have been selected for the analysis because they are painted on coniferous panels, they represent one region—North-West (NW) of European Russia (ER), which has a dense dendrochronological network ([Fig. 1](#)) and a continuous period of art development—from the early 15th to 17th century according to attributions by art historians and chemistry technologists. The purposes of this study were (1) to acquire precise and reliable dates for the icons; (2) to compare them with previous attributions by means of an art-historical analysis and chemical analyses of pigments; and (3) to assess additional statistical material for comparison of dendrochronological and radiocarbon dates from medieval icons in the NW ER.

[☆] This article is part of a special issue entitled “Russian tree-ring research”.

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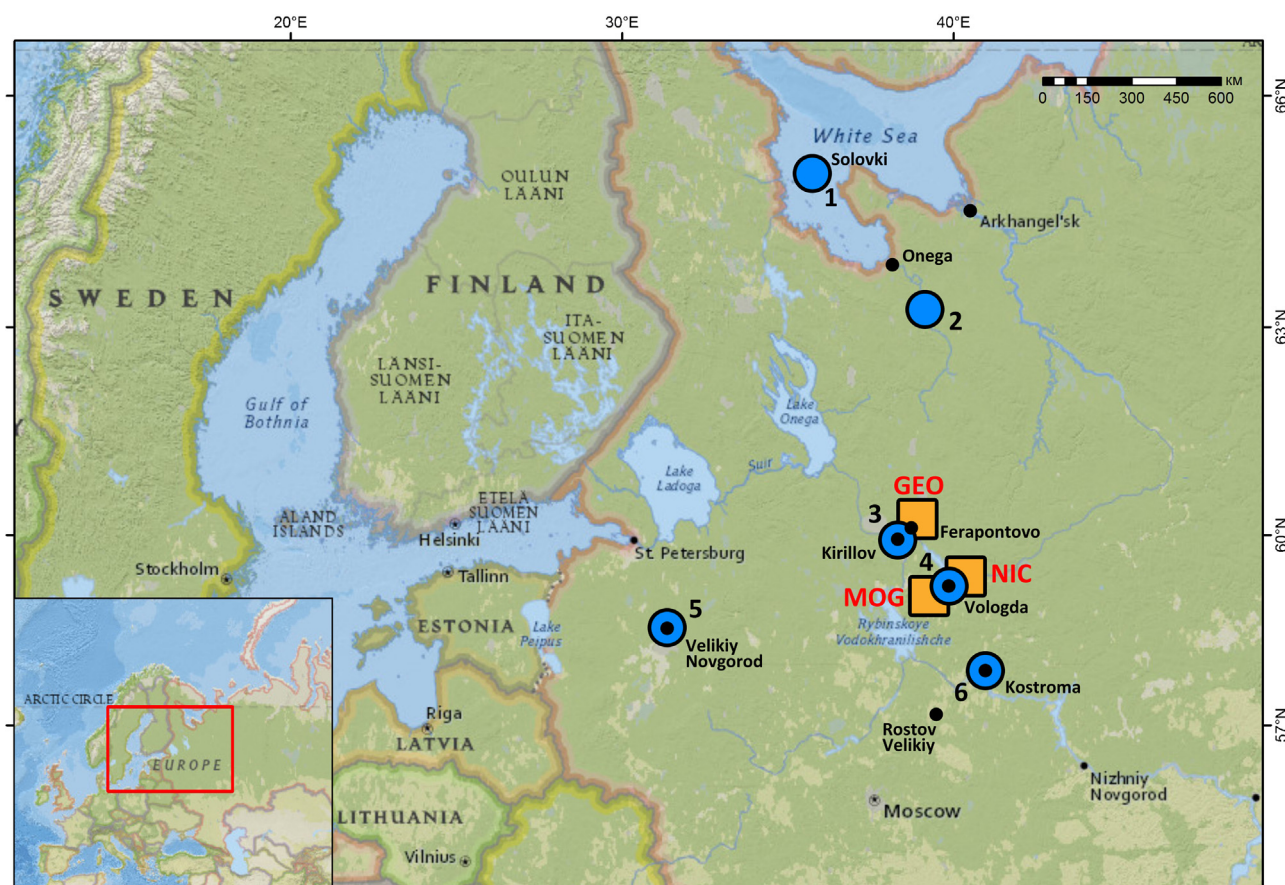


Fig. 1. Map of Europe (inset) and of the study region in Western Russia. Reference tree-ring chronologies of pine are marked with large blue circles (numbers correspond to the ones in Table 1). Locations of the icons are marked with squares and codes. Towns are marked with small black circles. All toponyms in the text are reflected on the map. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

2. Materials

2.1. The icon “Mother of God with the Child, Jerusalem type” (MOG)

The MOG icon was painted on one wooden panel of 64 cm high, 43 cm wide and 2.5 cm thick (Fig. 2). It belongs to the type of image of the Mother of God which was popular in the lands of Velikiy Novgorod in the 15th–16th century. The art historian O.V. Lelekova and the chemistry technologist M.M. Naumova (National Institute of Renovation, Moscow, personal communication) referred this icon to the Velikiy Novgorod art tradition of the beginning of the 15th century. E.M. Sayenkova (National Tretyakov Gallery, Moscow, personal communication) attributed this icon to the same art tradition and time period.

2.2. The icon “St. Nicholas of Myra in Lycia with scenes of his life” (NIC)

The NIC icon was painted on a wooden panel consisting of two boards, which were later fixed by three additional boards on the back (not analyzed). These two boards were produced from one tree. The size of the icon is 78 cm high, 61 cm wide and 3.4 cm thick (Fig. 2). The icon belongs to a small group of the Russian medieval icons with a red background. This type of icons was painted in Russian lands from the 13th to the 15th century. O.V. Lelekova and M.M. Naumova refer this icon to the beginning of the 15th century. E.M. Sayenkova also refers this icon to the first half of the 15th cen-

tury, possibly made by an unknown master from Rostov Velikiy (Sayenkova, 2011).

2.3. The icon “Saint George and the Dragon miracle” (GEO)

The GEO icon was painted on a wooden panel made from one board of 73 cm high, 54 cm wide and 3.7 cm thick (Fig. 2). The gesso of this icon, which is the ground coat for the painting, is based on chalk. According to the style of painting it was created in the Russian North between the end of the 16th—the beginning of the 17th century.

It is not always possible to determine the exact location where the icon has been painted. For the three icons it was only possible to trace them back to the locations on the map (Fig. 1): MOG and NIC were brought from Vologda and GEO from Ferapontovo, Vologda region. From additional sources it is more likely that the GEO icon was not transported before, but MOG and NIC probably were. Nevertheless the good condition of the wood reflects “northern” conditions for the residence of the icons because the icons are not damaged by wood destructive insects.

3. Methods

For dendrochronological analysis, the upper or lower edge of the panel was prepared with a sharp razor blade and then high-resolution macro-photographs of cross-sections of the boards were taken. These photographs were combined, and each tree ring was marked and measured in Coorecorder® (Cybis, 2006) to obtain an accurate tree-ring width series. Cross-dating was performed by

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