

Original scientific article

## **DIRECTION OF ANCIENT ORTHODOX CHURCHES IN THE REPUBLIC OF SERBIA NORTH FROM THE SAVA AND THE DANUBE**

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**Abstract:** This article presents the results of a mathematical-geographical analysis of the direction of ancient Orthodox churches in the Republic of Serbia north from the Sava and the Danube. These are medieval churches, or churches erected on the foundations of medieval churches, most of which katholikons, concentrated on the slopes of Fruška gora (“the Serbian Athos”). The main axes of all analysed churches (a total of 23) are located in the east sector of the horizon, i.e. they were all built according to the rule dictating that a church axis should be directed towards “the rising sun”. The axes of four churches could not be directed towards the rising sun (towards the rising sun on the physical horizon). The axes of three churches are directed towards the equinox East, while the axes of the others, with one exception only, deviate towards NE (among which two with solstice direction). Based on the observed general deviation towards NE, it can be assumed that the church axes were directed, on their founding, towards the rising sun in spring, mostly around Annunciation.

**Key words:** church direction, Medieval Serbia, Fruška gora, monasteries

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### **Ancient Orthodox churches in the north of the Republic of Serbia**

Building on the research into the direction of medieval European churches (Firnies and Köberl, 1989; Pantazis, Sinachopoulos, Lambrou and Korakitis, 2004; Hoare and Sweet, 2000; Liritzis and Vassiliou, 2007; Čaval, 2009) in the previous papers we have analysed the direction of most notable medieval Serbian churches, normally katholikons of the Raška (Tadić, 2012) and the Morava (Tadić and Gavrić, 2012) architectural styles. The first group of churches gravitates around the river basins of the Zapadna Morava (primarily the river basin of the Ibar), the Lim and the Beli Drim and the era of the Nemanjići, and the other group of churches gravitates around the river basins

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of three Moravas and the era of the Serbian Principality and Despotate. Using rivers as landmarks of geographical position, we can single out the third group consisting of churches with mixed architectural styles founded north from the Sava and the Danube following the fall of the Medieval Serbian State (fig. 1). With an exception of the katholikon of the Fenek monastery, all these churches are located in the territory of the Autonomous Province of Vojvodina, concentrating in the Srem region, on the slopes of Fruška gora (18 out of 23).

*Figure 1 - A mathematical-geographical position of ancient Serbian churches in the north of the Republic of Serbia (north from the Sava and the Danube) (see at page 104)*

Out of a total of 23, only two are non-katholikons, while the rest are katholikon. The adjective “ancient” that we ascribed to them to avoid the adjective “medieval” should be understood as “the churches which (whose predecessors) according to the tradition were founded in the Middle Ages, before the compass was used”.

### ***Ancient Orthodox churches in Fruška gora***

Observed on a map, Fruška gora stretches in the zone between latitude  $45^{\circ}$  N and the Danube stream. It is known for its vivid name of “the Serbian Athos”<sup>2</sup> because it houses as many as sixteen ancient Serbian Orthodox monasteries (fig. 1, tab. 1), which is less than a half of monasteries that used to be there. With an exception of the monastery of Bešenovo<sup>3</sup> (monastic location), all of them are active monasteries of the Srem Eparchy with the Serbian Orthodox Church. The monasteries are situated somewhat northward from parallel  $\varphi = 45^{\circ}$ , within spherical trapezium  $\Delta\lambda = 27' 10''$  and  $\Delta\varphi = 4' 39''$  with its centre in point T ( $45^{\circ} 08' 11''$  N,  $19^{\circ} 42' 32''$  E) (fig. 1). They are concentrated in the south (13 out of 16) and the east part of Fruška gora (11 out of 16), at an elevation from 162 m (Privina glava) to 270 m (Staro Hopovo). The shortest distance between the westernmost monastery (Privina glava) and easternmost monastery (Krušedol) is 50.4 km, and the shortest distance between the northernmost monastery (Rakovac) and the southernmost monastery (Mala Remeta) is 8.6 km.

The foundation of most Fruška Gora monasteries is connected to the Serbian rulers, nobles and monks who retreated before the Turkish invasion towards Srem taking with them the traditions of the Raška and Morava architectural styles. The most ancient ones are connected to the name of King Dragutin – the Serbian King (1276–1282) and “the King of Srem” (1284–

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<sup>2</sup> “The Serbian Athos” is also vividly referred to the region with nine Serbian monasteries in the region of the Ovčar-Kablar canyon.

<sup>3</sup> Hereinafter only the name of the monastery will be given (without “monastery”).

1316), and the last Serbian Despots – Đurađ Branković (1427–1456) and his successors. According to the traditional account, King Dragutin was the ktitor of monasteries of Bešenovo and Velika Remeta, while Despot Đurađ was the ktitor of several humbler monasteries (Marković, 1920) which have not been preserved in their original state, and on whose sites, as it is assumed, the present monasteries are located.

Table 1 - *Katholikons of the Fruška gora monasteries, alphabetical order – basic information*

<b>Monastery</b> <i>Catholicon</i>	<b>Possible founding date</b>	<b>Founder</b>	<b>Remark</b>
<b>Beočin</b> <i>Ascension of the Lord</i>	1732	Milivoje Milanković and his son Petar	The original church was founded in 16 <sup>th</sup> century.
<b>Bešenovo</b> <i>Holy Archangels</i>	1467	According to legend: King Stefan Dragutin (1282–1316)	Only foundations remained.
<b>Velika Remeta</b> <i>St. Demetrius</i>	15 <sup>th</sup> c.	According to legend: King Stefan Dragutin (1282–1316)	First time mentioned in 1543.
<b>Vrdnik</b> <i>Ascension of the Lord</i>	1801	?	The location of the original St. John church is marked by the cross.
<b>Grgeteg</b> <i>The Translation of the Relics of St. Nicholas</i>	1766	Despot Vuk Grgurević (1471–1485)	Probably on the foundations of the old church (1440/1460).
<b>Divša</b> <i>St. Nicholas</i>	1702	Despot Jovan Branković (1496–1502)	The original church was built at the end of the 15 <sup>th</sup> century.
<b>Jazak</b> <i>Holy Trinity</i>	1736	Despot Jovan Branković (1496–1502)	Built near the remains of the Old Jazak monastery.
<b>Krušedol</b> <i>The Annunciation of the Virgin</i>	1509	Bishop Maksim (1496–1516)	The 18 <sup>th</sup> century restoration didn't change the original look.
<b>Kuveždin</b> <i>St. Sava</i>	1520	Despot Stefan Štiljanović (?–1543)	
<b>Mala Remeta</b> <i>Shroud of the Virgin</i>	1738	Stanko Milinković Original church: King Dragutin	At the place of the original church.
<b>Novo Hopovo</b> <i>St. Nicholas</i>	1576	Lacko and Mirko Jovšić from Budapest.	The founder of the first church was bishop Maksim (1496–1516).
<b>Petkovicica</b> <i>St. Paraskevi</i>	16 <sup>th</sup> c. (1 <sup>th</sup> quarter)	Jelena Štiljanović (?–1546)	First time mentioned in 1522.
<b>Privina Glava</b> <i>Holy Archangels Michael and Gabriel</i>	1741	Despot Jovan Branković (1496–1502)	The original church was built in 1496 (according to legend in 12 <sup>th</sup> century).

<b>Monastery Catholicon</b>	<b>Possible founding date</b>	<b>Founder</b>	<b>Remark</b>
<b>Rakovac</b> <i>Holy Healers Cosmas and Damain</i>	1498	Raka Milošević <sup>4</sup>	
<b>Staro Hopovo</b> <i>St. Panteleimon</i>	1752	Bishop Maksim (1496–1516)	Prva crkva (Sv. Nikole) podignuta 1496–1502.
<b>Šišatovac</b> <i>Birth of the Virgin Mary</i>	1758	Bishop Vićentije Popović	The fourth church at that place.

In 15<sup>th</sup> century, when “south Hungary attained Serbian features” (Jiriček, 1988, p. 420) the monasteries of Bešenovo, Grgeteg, Staro Hopovo, Velika Remeta, Rakovac, Jazak and Vrdnik (Nova Ravanica) were erected as the last buildings of the medieval Serbian ecclesiastical architecture; not far from them, in 16<sup>th</sup> century, Krušedol, Novo Hopovo, Beočin, Kuveždin, Mala Remeta, Divša (Đipša) and Petkovića were erected; during 18<sup>th</sup> and early 19<sup>th</sup> century<sup>5</sup> on the site of ancient churches new ones were erected in Baroque style: Mala Remeta, Jazak, Šišatovac, Grgeteg, Fenek<sup>6</sup>, Beočin, Vrdnik and Kuveždin (Davidov, 2007). The Fruška Gora monasteries were built from 15<sup>th</sup> to early 19<sup>th</sup> century (tab. 1), and all of them, like other ancient Serbian monasteries, have the history that remembers demolition, fires, plunders and sacrilege<sup>7</sup>, as well as persistent renewals, construction and erections.

Table 2 - *The most ancient non-katholikon churches of Fruška gora – basic information*

<b>Church (Location)</b>	<b>Possible found- ing date</b>	<b>Founder</b>	<b>Remark</b>
<i>St. Nicholas Church (Slankamen)</i>	1468	Despot Vuk Grgurević	Restored several times.
<i>Church of the Presentation of Our Lord (Krušedol)</i>	1512	Angelina Branković	Founded as a katholikon dedicated to J. Zlatousti.

Except for Bešenovo, all of them are renewed today and protected by the government as high-priority cultural heritage, and as such they have been comprehensively studied and described, among other, both from historic and geographical perspective. Except for katholikons, on the slopes of Fruška gora

<sup>4</sup> The chamberlain of despot Jovan Branković (1499–1502)

<sup>5</sup> Only the katholikon of the Vrdnik monastery (1801–1811)

<sup>6</sup> In historic terms, the Fenek monastery can be provisionally included in the Fruška gora monasteries, while in geographic terms it cannot.

<sup>7</sup> During the Turkish rule was, as well as during WW2 when Srem was under the rule of the infamous Independent State of Croatia.

there are also two churches erected not long after the fall of the Medieval Serbian State. These are St. Nicholas Church in Stari Slankamen and Church of the Presentation of Our Lord in Krušedol, but the latter was founded as katholikon (fig. 1, tab. 2).

### ***Ancient Orthodox “non-Fruška gora” churches (katholikons)***

In the north of Serbia, north from the Sava and the Danube, outside Fruška gora there are five churches meeting the described condition to be classified as “ancient”. These are the katholikon of Bođani and Kovilje (Bačka region), Vojlovica and Mesići (Banat region) and Feneka (Srem region) (fig. 1, tab. 3).

Table 3 - *Katholikons of “non-Fruška gora” monasteries, alphabetical order - basic information*

<b>Monastery Catholikon</b>	<b>Possible founding date</b>	<b>Founder Chief architect</b>	<b>Remark</b>
<b>Bođani</b> <i>Presentation of the Virgin</i>	1722	Mihailo Tamišvarlija	Original church was built 1478. Founded by Stefan Branković
<b>Vojlovica</b> Holy Archangels Michael and Gabriel	1405	Despot Stefan Lazarević	
<b>Kovilj</b> Holy Archangels Michael and Gabriel	1741	Petar Andrejević <i>F. Kosta and N. Krapić</i>	Original church: 16 <sup>th</sup> century.
<b>Mesić</b> <i>St. John of Baptist</i>	15 <sup>th</sup> c.	?	Destroyed and restored again several times.
<b>Fenek</b> <i>St. Paraskevi</i>	15 <sup>th</sup> c. (2 <sup>nd</sup> half)	Stefan and Angelina Branković	

### **Mathematical-geographical analysis**

In phase one of the work, geographic and Cartesian coordinates were determined for every church, and geographic azimuths (A) of their main (longitudinal) axes were measured, that is, deviations of such axes ( $\Delta A$ ) from the east point, with a precision of  $\pm 1^\circ$  (tab. 4–6, fig. 4). The coordinates and azimuths were determined by orthophotography, provided that the azimuths were measured on site during summer of 2012 (Nešić, 2012) by the already described gnomonic method (Tadić and Petrović, 2011). During the field work, except for the Katolikon of every monastery, the east sector of the physical horizon was also photographed (where possible). In phase two of the work, carthometric method was used to determine horizontal coordinates of point *T* where the vertical of the axis of the relevant katholikon cuts across the physical horizon, while in phase three the values of the sun declinations ( $\delta$ ) were determined

whereby it comes out in that point, and the corresponding dates were determined according to the Gregorian and the Julian calendars<sup>8</sup>. The first two phases of the work are presented on the example of St. Panteleimon Church, the katholikon of the monastery of Staro Hopovo (fig. 2, fig. 3).

Figure 2 - *St. Panteleimon Church, the katholikon of the monastery of Staro Hopovo – a view from the south side and from the west side (see at page 108)*

The single-nave St. Panteleimon Church is the smallest among the Fruška gora katholikon (14 m-long). It was erected in 1752 on the site of the original St. Nicholas Church founded in late 15<sup>th</sup> century whose ktitor was Bishop Maxim (tab. 1). The vertical of the axis cuts across the horizon at point T which is at a distance of 297 m and surmounts the church by 50 m. The horizontal coordinates of point T are  $A = 70^\circ$ ,  $h = 9.8^\circ$ , so that it can be the point of the sunrise at declination  $\delta = 21^\circ 00'$ , i.e. on 25 May and 18 July according to GC or 14 May and 7 July 1752 according to JC. Assuming that the present church preserved the direction of the original church from the late 15<sup>th</sup> century, then the dates are 15 May<sup>9</sup> and 9 July.

Figure 3 - *The first two phases on the example of katholikon of the monastery of Staro Hopovo: a) azimuth measurement by orthophotography; b) panoramic radiograph of the east sector of the physical horizon; c) construction of cross-section along the church axis at TC25 and determination of vertical angle  $\alpha$  (the height of point T over the horizon) (see at page 110)*

Figure 4 - *Direction of katholikon of the Fruška gora monasteries (see at page 111)*

Table 4 - *Direction of katholikon of the Fruška gora monasteries and the sun geometry (MF – movable feast)*

Monastery Catholikon	$\Delta A$ $\delta$	GC DD-MM	JC DD-MM	C	Patron's day JC
<b>Beočin</b> <i>Ascension of the Lord</i>	20° NE 31.10°				MF
<b>Bešenovo</b> Holy Archangels Michael and Gabriel	19° NE 28.07°	The Sun doesn't rise in the katholikon's vertical			08-11, 13-07
<b>Velika Remeta</b> <i>St. Demetrius</i>	11° NE 12.82°	23-04 18-08	14-04 09-08	15 <sup>th</sup>	26-10
<b>Vrdnik</b> <i>Ascension of the Lord</i>	20° NE 16.08°	03-05 07-08	21-04 26-07	19 <sup>th</sup>	MF
<b>Grgeteg</b> <i>The Translation of the Relics of St. Nicholas</i>	5° NE 8.88°	11-04 29-08	02-04 20-08	15 <sup>th</sup>	09-05

<sup>8</sup> Hereinafter abbreviated as follows: Gregorian calendar = GC, Julian calendar = JC

<sup>9</sup> Regarding the beginning of a construction season, it is always that the first date is accepted as more probable.

*Direction of ancient orthodox churches in the Republic of Serbia*

<b>Monastery</b> Catholicon	$\Delta A$ $\delta$	<b>GC</b> <b>DD-MM</b>	<b>JC</b> <b>DD-MM</b>	<b>C</b>	<b>Patron's day</b> <b>JC</b>
<b>Divša</b> <i>St. Nicholas</i>	7° NE 7.95°	09-04 01-09	31-03 23-08	15 <sup>th</sup>	09-05
<b>Jazak</b> <i>Holy Trinity</i>	23° NE 26.53°	The Sun doesn't rise in the catholicon's vertical			MF
<b>Krušedol</b> <i>The Annunciation of the Virgin</i>	34° NE 29.6°				25-03
<b>Kuveždin</b> <i>St. Sava</i>	8.5°SE 4.70°	31-03 10-09	21-03 31-08	16 <sup>th</sup>	14-01
<b>Mala Remeta</b> Shroud of the Virgin	16.5° NE 3.61°	28-03 12-09	17-03 01-09	16 <sup>th</sup>	01-10
<b>Novo Hopovo</b> <i>St. Nicholas</i>	25° NE 23.78°	≈ 22-06	12-06	16 <sup>th</sup>	06-12
<b>Petkovica</b> <i>St. Paraskevi</i>	21.5° NE 24.55°	≈ 22-06	12-06	16 <sup>th</sup>	14-10
<b>Privina Glava</b> Holy Archangels Michael and Gabriel	2° NE 4.84°	01-04 09-09	21-03 29-08	15 <sup>th</sup>	08-11, 13-07
<b>Rakovac</b> <i>Holy Healers Cosmas and Damain</i>	0°	The main axis of the catholicon is in the first vertical			01-07
<b>Staro Hopovo</b> <i>St. Panteleimon</i>	20° NE 20.85°	25-05 18-07	16-05 09-07	15 <sup>th</sup>	27-07
<b>Šišatovac</b> <i>Birth of the Virgin Mary</i>	0°	The main axis of the catholicon is in the first vertical			08-09

Table 5 - *Direction of the most ancient non-katholikon Fruška gora churches and the sun geometry*

<b>Church</b> (Location)	$\Delta A$ $\delta$	<b>GC</b> <b>DD-MM</b>	<b>JC</b> <b>DD-MM</b>	<b>C</b>	<b>Patron's day</b> <b>JC</b>
<i>St. Nicholas Church</i> (Slankamen)	8° NE 5.63°	03-04 07-09	25-03 29-08	15 <sup>th</sup>	06-12
<i>Church of the Presentation of Our Lord</i> (Krušedol)	20° NE 18.57°	13-05 29-07	03-05 19-07	16 <sup>th</sup>	13-11

Table 6 - *Direction of katholikons of "non-Fruška gora" monasteries and the sun geometry*

<b>Monastery</b> Catholicon	$\Delta A$ $\delta$	<b>GC</b> <b>DD-MM</b>	<b>JC</b> <b>DD-MM</b>	<b>C</b>	<b>Patron's day</b> <b>JC</b>
<b>Bođani</b> <i>Presentation of the Virgin</i>	6.5° NE 5.61°	03-04 08-09	25-03 30-08	15 <sup>th</sup>	21-11
<b>Vojlovica</b> Holy Archangels Michael and Gabriel	21° NE 10.38°	16-04 25-08	07-04 16-08	15 <sup>th</sup>	08-11, 13-07

Monastery Catholicon	$\Delta A$ $\delta$	GC DD-MM	JC DD-MM	C	Patron's day JC
<b>Kovilj</b> Holy Archangels Michael and Gabriel	8° NE 5.63°	03-04 07-09	25-03 29-08	16 <sup>th</sup>	08-11, 13-07
<b>Mesić</b> <i>St. John of Baptist</i>	7 NE 9.64°	14-04 28-08	05-04 19-08	15 <sup>th</sup>	24-06
<b>Fenek</b> <i>St. Paraskevi</i>	30° NE 20.80°	24-05 19-07	15-05 10-07	15 <sup>th</sup>	26-07

For most Fruška gora monasteries the early history is not clear (Pre-Turkish era). For the original churches there are traditional accounts but no reliable historic data as to the exact date of their erection, who were their ktitors and proto-master builders. They were renewed or replaced by new ones, mixing the traditional architectural styles with Baroque style, and their dedications were changed. The katholikon of the Šišatovac Monastery, for instance, is the fourth church on the site: 1–2) in 1520, the Žiča abbot Teofilo with his brethren, on the site of the ancient and small St. Nicholas Church erected a church dedicated to Our Lady's Birth which did not last long; 3) the proto-master builders Jovan and Gašpar from Primorje built a two-dome stone church in 1643; 4) the present monumental katholikon was being built for twenty years (1758–1778). For new churches, their position is not always clear (site and direction) in comparison to the churches before them: were they built on, around<sup>10</sup> or near the foundations of the ancient church. Therefore, it is known for sure that the mentioned Šišatovac katholikon was erected on the site of the ancient church since “the conservators during research...found an ancient church in the foundations, the one dating back to 16<sup>th</sup> century” (Medaković, 2010, p. 632), just as the katholikon of Privina glava under which there were foundations discovered of a building, possibly a church whose axis, though, considerably deviates from the axis of the present katholikon (Savičev, 2012).

On the other hand, it is also certain that the katholikons of Vrdnik and Jazak are moved in comparison to the original churches. The open issues about the time of building the original katholikons and the position of new katholikons compared the original ones bring about an uncertainty as to who and how (to what purpose) directed the church, i.e. an uncertainty as to whose skill of direction we are inspecting – the proto-master builder's of the original church (the medieval proto-master builder) or the proto-master builder's of subsequent centuries. In all Fruška gora monasteries, the east sector of the physical horizon is very close, which is conditioned by the position of Fruška gora itself. It stretches west to east so that water streams normally have the meridian directional run; the monasteries are situated in the valleys of brooks so that the katholikons are positioned transversely on

<sup>10</sup> New churches were usually more spacious, so that they covered the foundations of the ancient churches.

them and the view through the altar window ends on the east slope of the brook valley. The exception is St. Nicholas Church in Stari Slankamen which features a full open view towards the east sector of the horizon same as the katholikon of “Non-Fruška gora” monasteries (with the exception of the Mesić monastery).

The monasteries were erected in a “tame” topographic space so that the direction of katholikon was not dictated by the relief.

### **Conclusion**

Out of twenty-three discussed ancient Serbian churches north from the Sava and the Danube (fig. 5), only the axes of the katholikon of Rakovac and Šišatovac are directed towards the east point of the horizon. From mathematical and geographic standpoint, they are ideally directed, which means that their proto-master builders knew of the exact method of direction. They can be joined by the katholikon of Privina glava where the deviation of the main axis from the east point is only 2° NE (fig. 2, tab. 2).

*Figure 5 - Layout and direction of the ancient Orthodox churches in the Republic of Serbia, north from the Sava and the Danube (see at page 114)*

Out of the three katholikon, very important for this research is the katholikon of Rakovac, Holy Healers Cosmas and Damain Church (21 m long), since it is a church which, although renewed several times, stands on the site ever since the late 15<sup>th</sup> century. Towards the east point, it was immaculately directed by a medieval Serbian proto-master builder, continuing the work of the Morava architectural style proto-master builders whose skills of direction are most compellingly witnessed by the katholikon of Ljubostinja and Kalenić monasteries (Tadić and Tošić, 2012). The Šišatovac katholikon (30 m long) inherited the direction set by the medieval proto-master builder, while the proto-master in Privina glava seems to have positioned the main axis of the new katholikon (29 m long) closer to equinox direction<sup>11</sup>. Indisputably, the medieval proto-masters of Rakovac and Šišatovac knew of Vitruvius’ gnomonic method for determining the main directions on the horizon. The main directions could be also determined by the Northern Star but there is no mention of that method anywhere in medieval Serbian manuscripts and it is not in line with the liturgical determination mentioning only “East” and “Sunrise”<sup>12</sup>. Also, there is no mention of using the compass.<sup>13</sup>

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<sup>11</sup> A similar “adjustment” of foundations was discovered in several medieval Serbian churches, for instance, in katholikon of St. Archangels Monastery in Prizren and the katholikon of Gradac monastery, and that is what warns us to be cautious when answering the question who determined the direction of the present church.

<sup>12</sup> Night is left out as incompatible with the Christian symbolism of East.

<sup>13</sup> The first compass in the territory of Serbia is still uninvestigated topic.

The deviation of the main axis of the remaining twenty churches may be explained starting from the assumption that the proto-masters, consistently applying the ecclesiastical rule, directed them towards the point of sunrise on a specific day. In theory, the sunrise points at  $45^\circ$  latitude move throughout the year along the mathematical horizon range  $68^\circ 30'$  ( $34^\circ 15'$  from the east point towards NE and the same towards SE) and the axes of all churches discussed lie in that sector of the horizon (Tab. 4–6). But it does not mean that they could have been oriented towards the sunrise as the actual sunrise points, due to relief effect, were moved clockwise. After determining the values of declinations at which the sun could rise on the physical horizon in the vertical of every church, the katholikons of Beočin, Bešenovo, Jazak and Krušedol were eliminated: on founding, their axes could not be directed toward the rising sun since  $\delta > 23^\circ 27'$  (tab. 4). Bearing in mind that the measurement precision is  $\pm 1^\circ$ , one can say that the axis of katholikons of Novo Hopovo and Petkovica were approximately directed towards the actual sunrise points in summer solstice even though they also have  $\delta > 23^\circ 27'$  (tab. 4).

In St. Nicholas Church in Stari Slankamen and in katholikons of eight monasteries (Mala Remeta, Kuveždin, Divša, Grgeteg, Bođani, Mesić, Kovilj, Vojlovica) the sun rises in their vertical in the period from 17 March to 12 April (tab. 4–6) so it can be assumed that proto-masters directed them on those days by equating the mathematical with the physical horizon. No written rule was found that was followed by the medieval Serbian proto-masters, so it may be that they handed over the “secret” to their successors that a church would be properly directed if they direct its main axis towards the rising sun around Annunciation.

In the Church of the Presentation of Our Lord in Krušedol and in the remaining four katholikons (Velika Remeta, Vrdnik, Staro Hopovo, Fenek) the main axes lie in the sector of the physical horizon over which the sun rises in the period from 14 April to 16 May. That period follows the Annunciation period observed in the previous group of churches and together they represent the period during which most ancient churches may have been founded north from the Sava and the Danube. That is why all of them, except for the katholikon of Kuveždin, have the summer direction (fig. 4). That is what makes them similar to the group of the most notable churches of the Morava architectural style, and different to the group of the most notable churches of the Raška architectural style.

The possible dates of founding the ancient Serbian churches north from the Sava and the Danube, the same as for the most notable churches of the Morava and Raška architectural styles cannot be linked to their patrons, i.e. to the days dedicated to the patron saints in the ecclesiastical calendar.

## **References (see at page 115)**