

Peter Andolšek

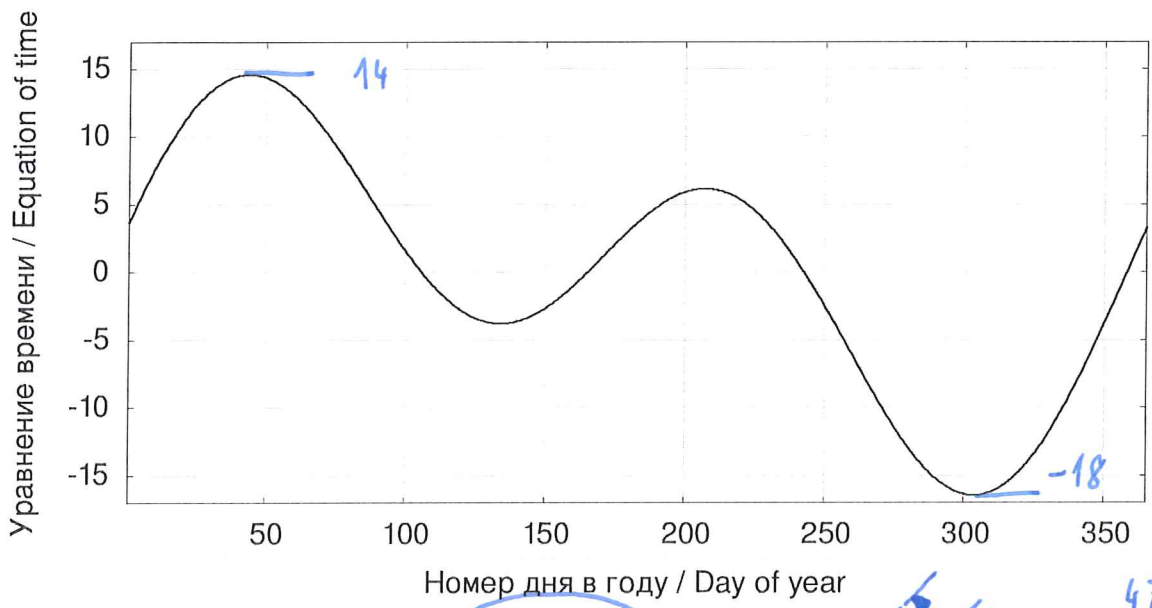
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Na šestih fotografijah (A do G) so iz različnih krajev tekom leta posneti položaji Sonca ob istem srednjem Sončevem času. Za vsako fotografijo posebej zapiši, iz katere poloble Zemlje in v katerem delu dneva (zjutraj, sredi dneva, zvečer) je bilo fotografirano Sonce. Katera fotografija je bila posneta najdlje od ekvatorja? Vse zaključke pojasni.

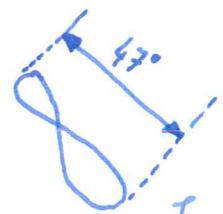
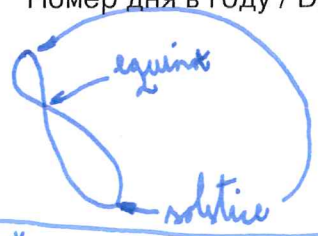
Predpostavi, da je srednji Sončev čas tisti, ki ga kaže navadna ura, pravi Sončev čas pa je tisti, ki ga kaže sončna ura.

V minutah izražena razlika med srednjim in pravim Sončevim časom (t.i. časovna enačba) v odvisnosti od dni v letu (od 1. januarja) je prikazana na spodnjem grafu.



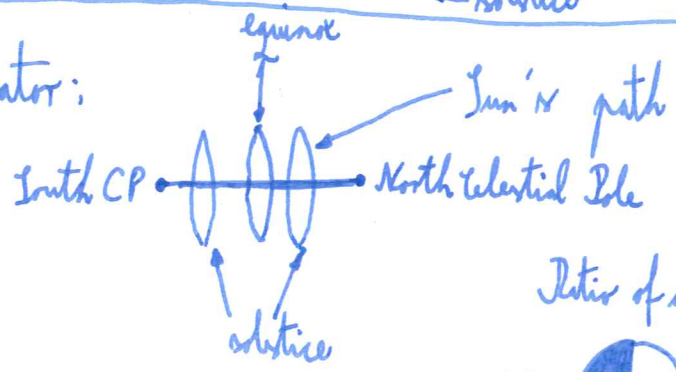
Odgovori:

Analema:

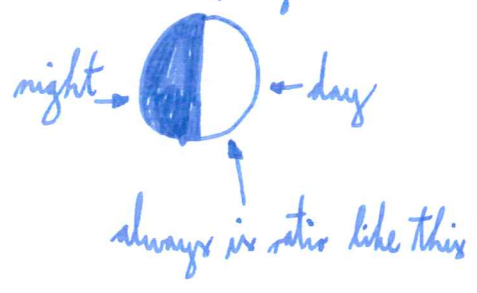


First we determine opposite:

Equator:



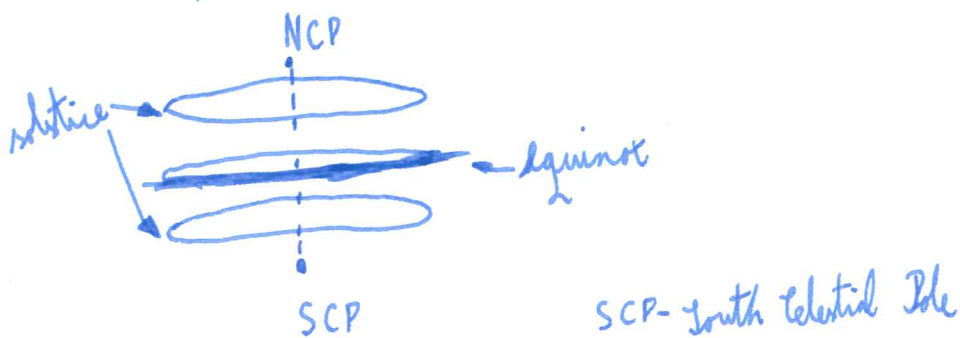
Ratio of day:



North pole:

NCP - North Celestial Pole

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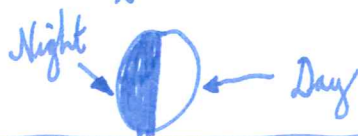
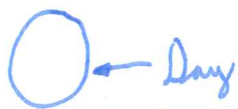


Ratio of day:

Winter solstice:

Summer solstice:

Equinox:



In the equator, Sun is always above horizon on 12.00. (Twice a year in zenith)

In the North pole, Sun is above horizon on 12.00 from 21.3. to 23.9.

In the North pole, Sun isn't above horizon on 12.00 from 23.9. to 21.3.

Anallena must be straight, when is 12 o'clock.

This is on the picture B.

If anallena is on the left, then it's morning.

This is on the pictures A, E.

If anallena is on the right, then it's evening.

This is in the picture G, C and D.

South is opposite

Graph on the first page is thinner in Winter than in Autumn.

So anallena is thinner in the upper side. (In northern hemisphere.)

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Picture G:

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Analemma is on the right - it's early evening. (Afternoon.)
Analemma is thinner on the upper side. That's because it's on the northern hemisphere.
Southern side is nearly touching horizon. We know that southern side is $23,5^\circ$ far of center of analemma. Thus, this place is on latitude $\varphi = 90^\circ - 24^\circ = \underline{\underline{66^\circ}}$ (North)

Picture B:

Analemma is straight. It's photographed on 12:00.
It's thinner on the upper side - it's on the northern hemisphere.
Southern side is 10° far from the horizon. $\varphi = 90^\circ - (23,5^\circ + 10^\circ) = 90^\circ - 34^\circ = \underline{\underline{56^\circ}}$ (North)

Picture D: South-opposite
The picture shows, that Sun is above horizon just in Winter (from 23.9. to 21.3.)
So, this is opposite than North Pole - it's nearly South Pole. Analemma's center is 7° far from horizon. $\varphi = 90^\circ - 7^\circ = \underline{\underline{83^\circ}}$ (South). This is on the southern hemisphere.
It's not straight. It's little afternoon (afternoon.)

Picture E:

Analemma is on the left - it's morning.
It's thinner on the upper side: that means, it's on the northern hemisphere.
The center is (if it'll be noon) 45° far from horizon. $\varphi = 90^\circ - 45^\circ = \underline{\underline{45^\circ}}$ (North).

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Picture A:

Annulus is not straight. It's morning.

It's thinner on the upper side - northern hemisphere.

Southern side is (in the noon) 40° far from the horizon. $\varphi = 90^\circ - 40^\circ = \underline{50^\circ}$ (North).

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Picture C:

South-opposite

Annulus is thinner on the other side than usual. It's in the southern hemisphere.

It's on the left - evening.

The center is (in the noon) 30° far from the horizon - it's $\varphi = -90^\circ + 30^\circ = \underline{-60^\circ}$ (South)

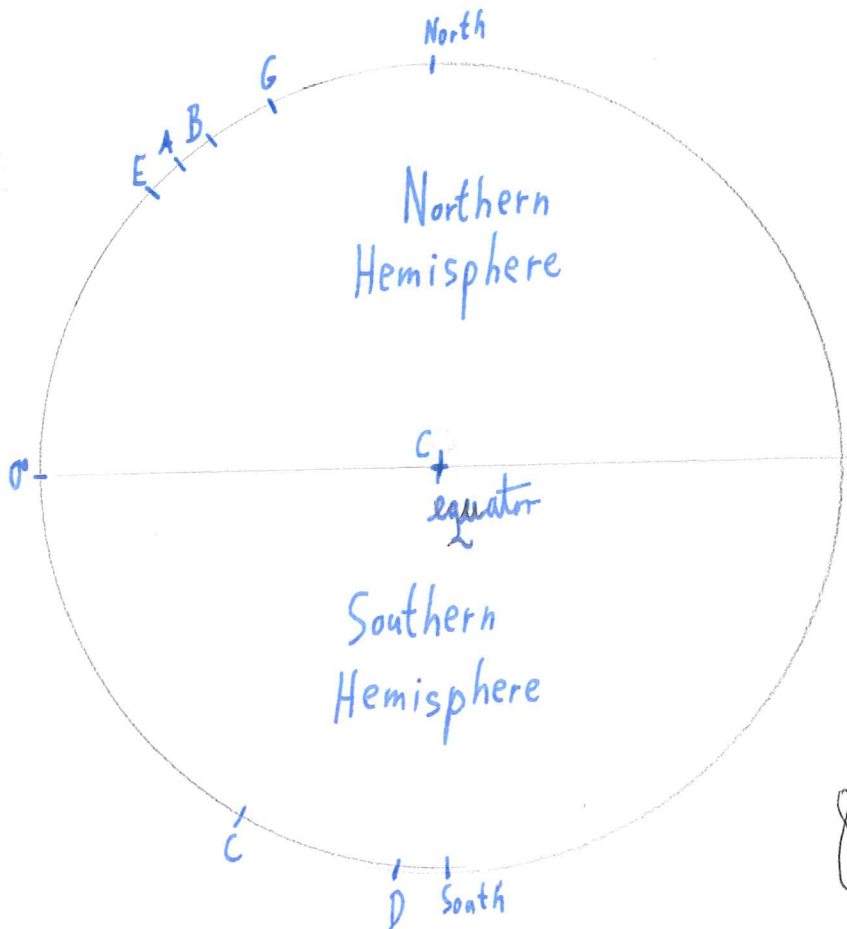
PICTURE F IS NOT GIVEN ON SHEET!

It doesn't exist.

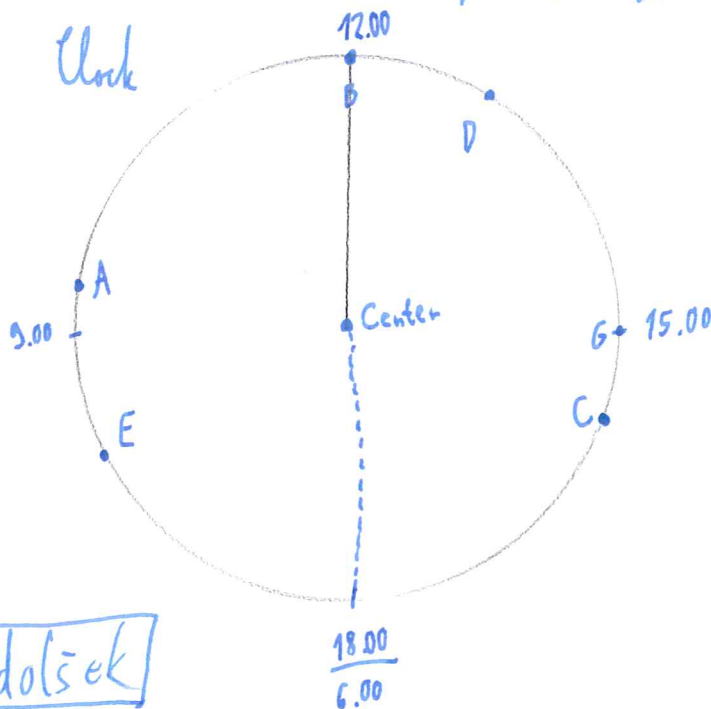
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PICTURES:

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The farthest place from equator is D.



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Резултати: | Results:

A: morning - 50° (N)

B: noon - 56° (N)

C: evening - 60° (S)

D: almost noon - 83° (S)

E: morning - 45° (N)

G: evening - 66° (N)

N - North

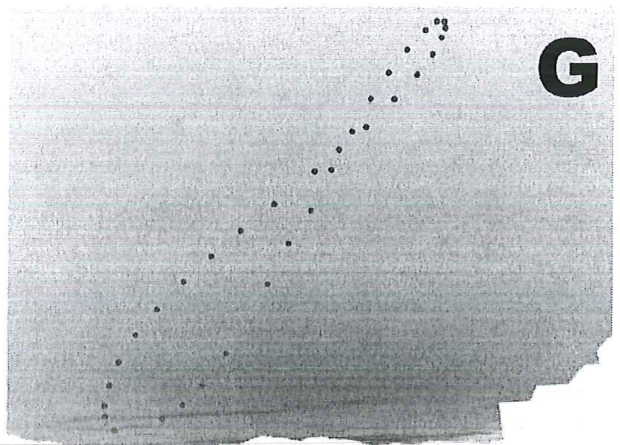
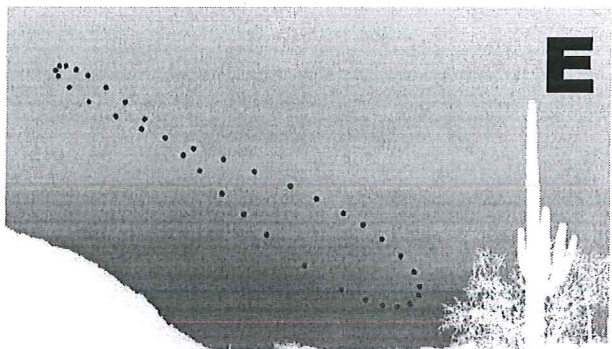
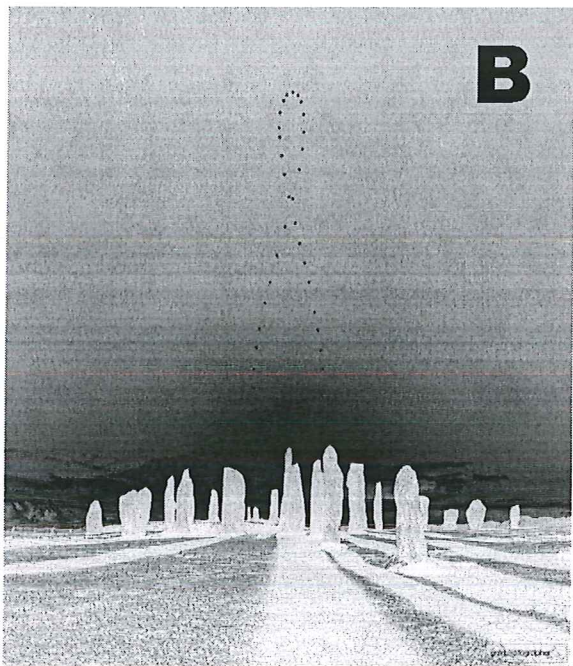
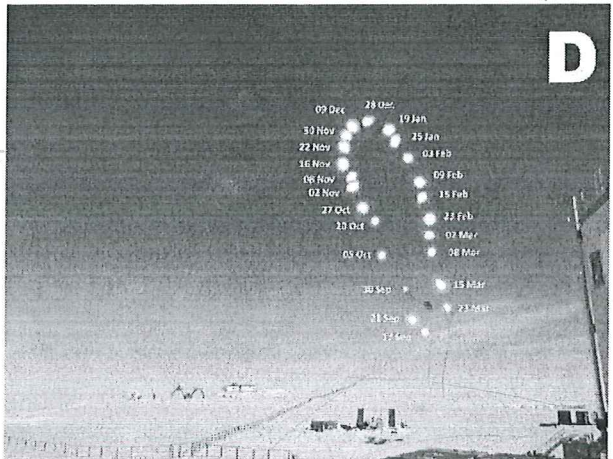
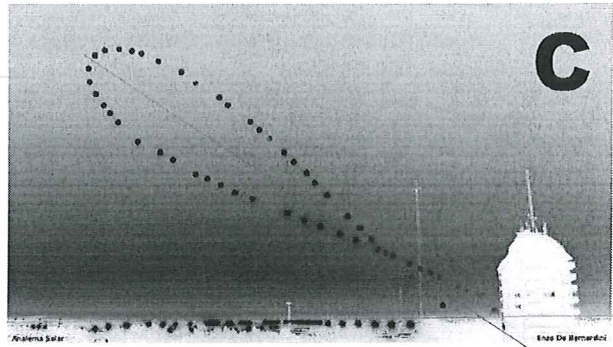
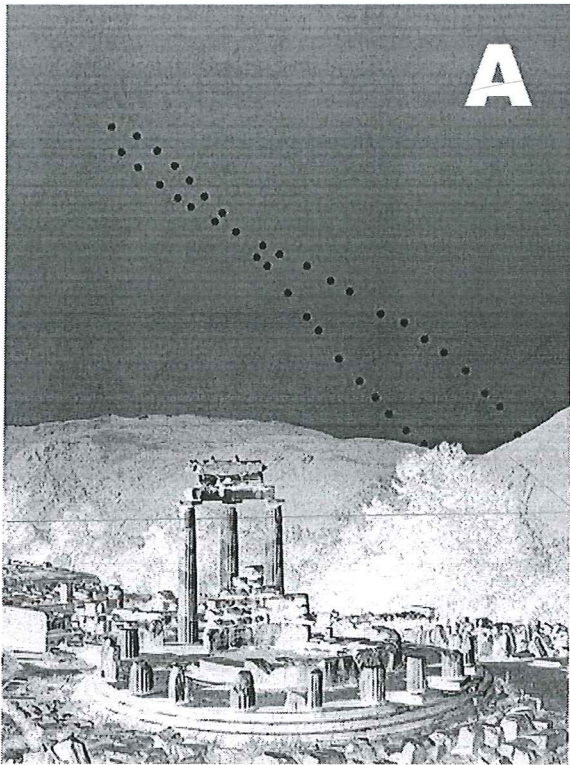
S - South

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$\varphi_{\text{EQUATOR}} \ll D$

The furthest place is D from equator.

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Конец

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