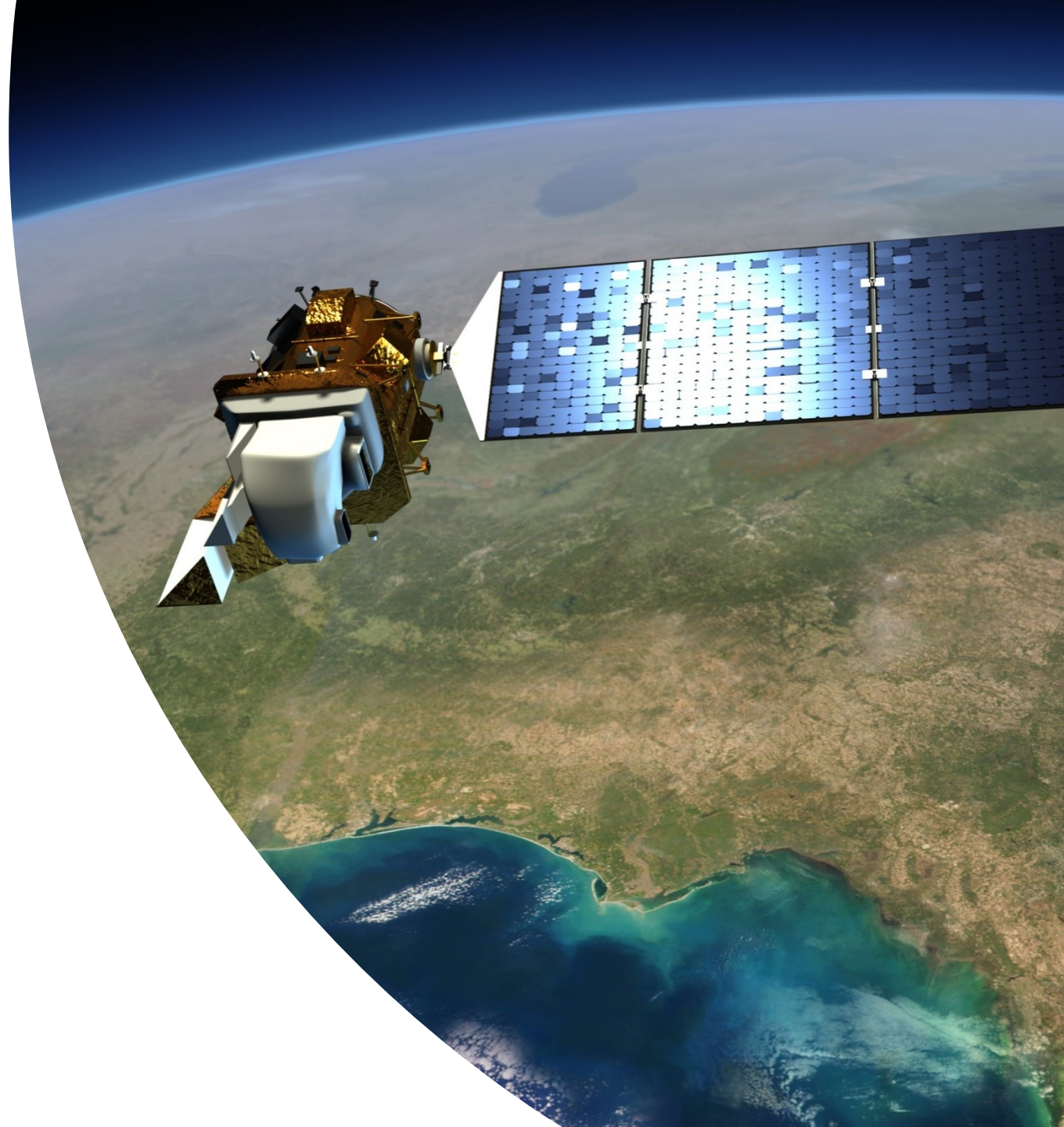


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# Základy diaľkového prieskumu Zeme

– cvičenie 2

Mgr. Katarína Onačillová, PhD.



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1

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Interpretácia metadát

#### 4. Search Results

If you selected more than one data set to search, use the dropdown to see the search results for each specific data set.

Show Result Controls

Data Set

Click here to export your results »

L8 OLI/TIRS

« First < Previous 1 > Next > Last »

Displaying 1 - 1 of 1



Entity ID:LC81870262016221LGN00  
Coordinates:48.86645,20.91212  
Acquisition Date:08-AUG-16  
Path:187  
Row:26



## Ľavý klik – Ukážka metadát a prehľadávanie

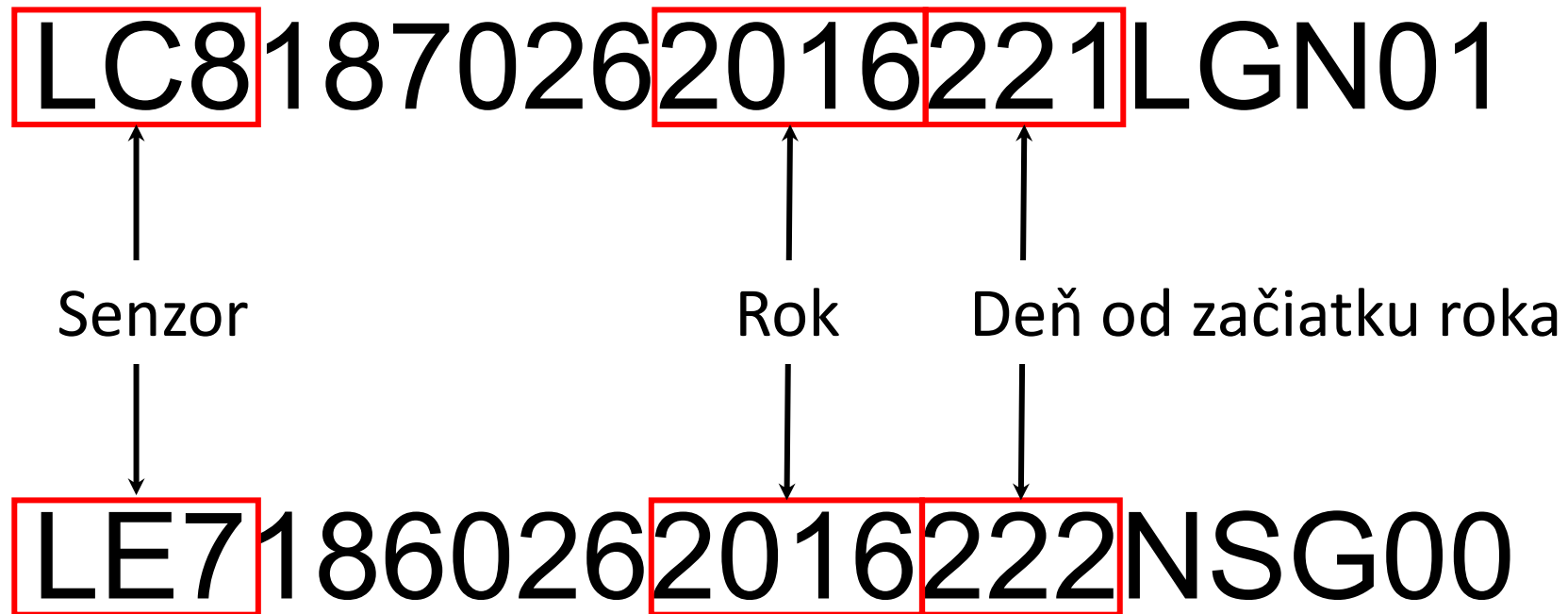
Mapa Satelitné Oświęcim Kraków Wieliczka Bochnia Brzesko Tarnów (47° 51' 53" N, 019° 34' 39" E) Options Overlays

Full Display of LC81870262016221LGN00

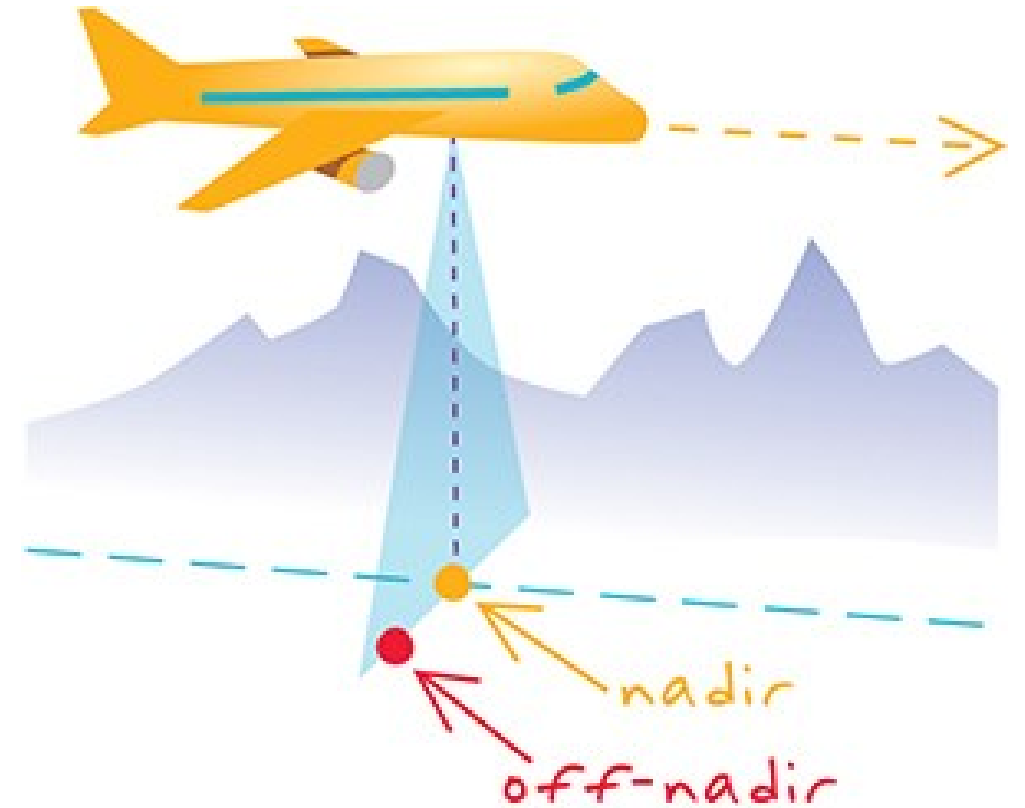
Data Set Attribute	Attribute Value
<a href="#">Landsat Scene Identifier</a>	LC81870262016221LGN00
<a href="#">WRS Path</a>	187
<a href="#">WRS Row</a>	026
<a href="#">Target WRS Path</a>	187
<a href="#">Target WRS Row</a>	026
<a href="#">Full or Partial Scene</a>	FULL
<a href="#">Nadir/Off Nadir</a>	NADIR
<a href="#">Data Category</a>	NOMINAL
<a href="#">TIRS SSM Model</a>	FINAL
<a href="#">Bias Parameter File Name OLI</a>	LO8BPF20160808091941_20160808094158.01
<a href="#">Bias Parameter File Name TIRS</a>	LT8BPF20160803085042_20160818203550.01
<a href="#">Calibration Parameter File</a>	L8CPF20160701_20160930.02
<a href="#">RLUT File Name</a>	L8RLUT20150303_20431231v11.h5
<a href="#">Roll Angle</a>	-.001
<a href="#">Station Identifier</a>	LGN
<a href="#">Day/Night</a>	DAY
<a href="#">Data Type Level1</a>	L1T
<a href="#">Sensor Identifier</a>	OLI_TIRS

Open New Window Close

# Landsat – označenie súborov



Data Set Attribute	Attribute Value
<a href="#">Landsat Product Identifier</a>	LC08_L1TP_187026_20160808_20170322_01_T1
<a href="#">Landsat Scene Identifier</a>	LC81870262016221LGN01
<a href="#">Acquisition Date</a>	2016/08/08
<a href="#">Collection Category</a>	T1
<a href="#">Collection Number</a>	1
<a href="#">WRS Path</a>	187
<a href="#">WRS Row</a>	026
<a href="#">Target WRS Path</a>	187
<a href="#">Target WRS Row</a>	026
<a href="#">Nadir/Off Nadir</a>	NADIR
<a href="#">Roll Angle</a>	-.001
<a href="#">Date L-1 Generated</a>	2017/03/22
<a href="#">Start Time</a>	2016:221:09:26:25.9597240
<a href="#">Stop Time</a>	2016:221:09:26:57.7297210



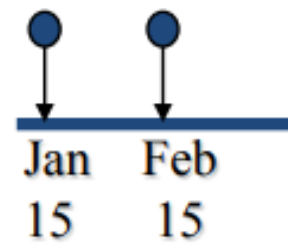
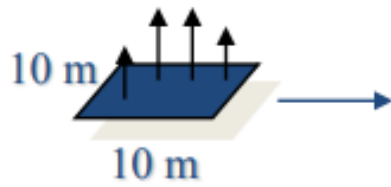
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# 2

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Rozlíšenie záznamu DPZ

# 4 zložky rozlíšenia záznamu / Rozlíšenie záznamu



- **1. priestorová** (mm, cm, dc, m, km)
- **2. spektrálna** (spektrálny rozsah)
  - VID, IČ, termálne, radar
- **3. rádiometrická** (rozdelenie toku radiácie)
  - elementárna jednotka <0, 255>
- **4. temporálna** (časový interval 2 záznamov)
  - operatívnosť nosičov – lietadlá, družice

# Multispektrálne skenovanie – priestorové rozlíšenie

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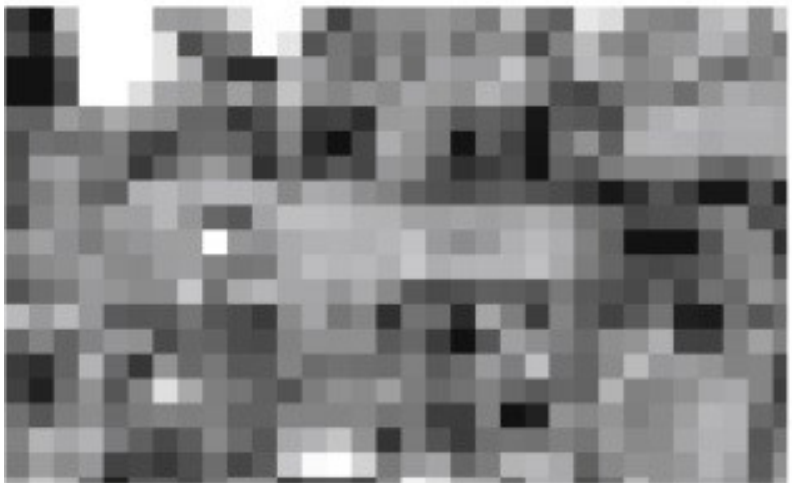
**(A)** 1 m



**(B)** 10 m



**(C)** 30 m



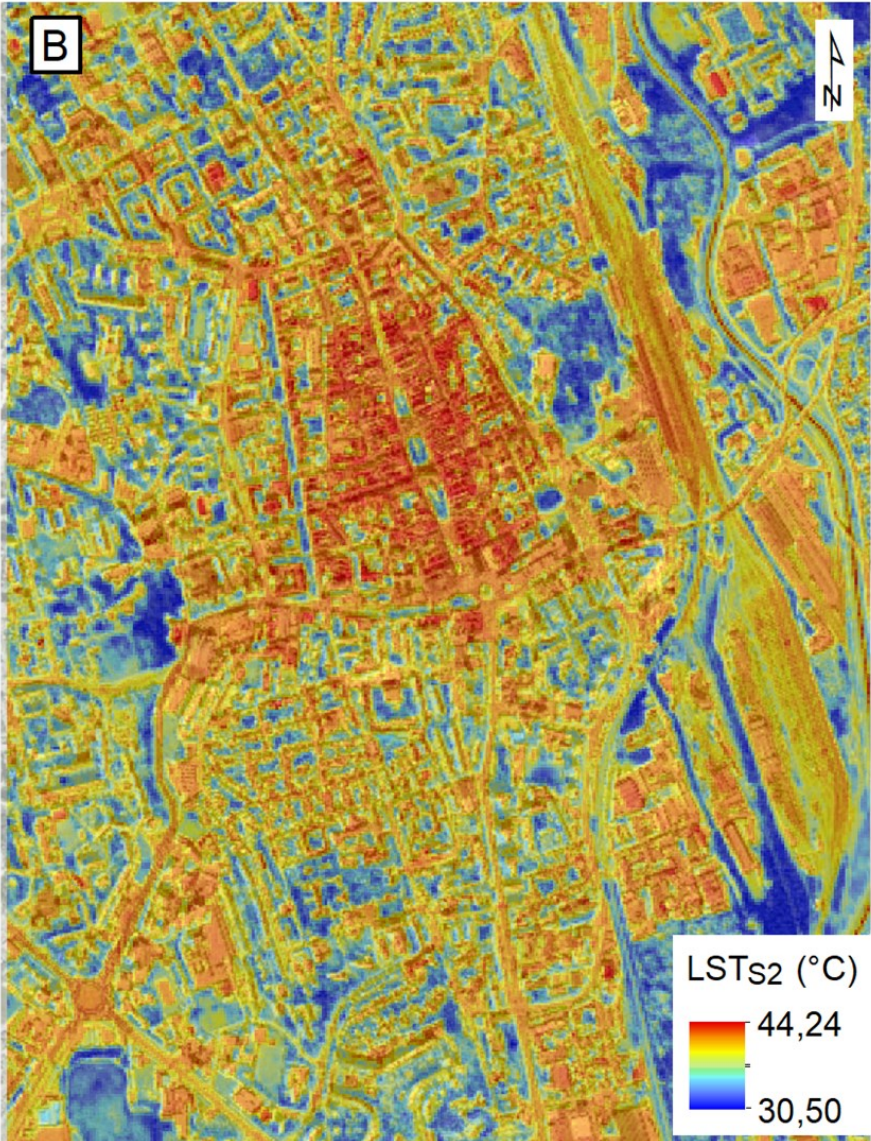
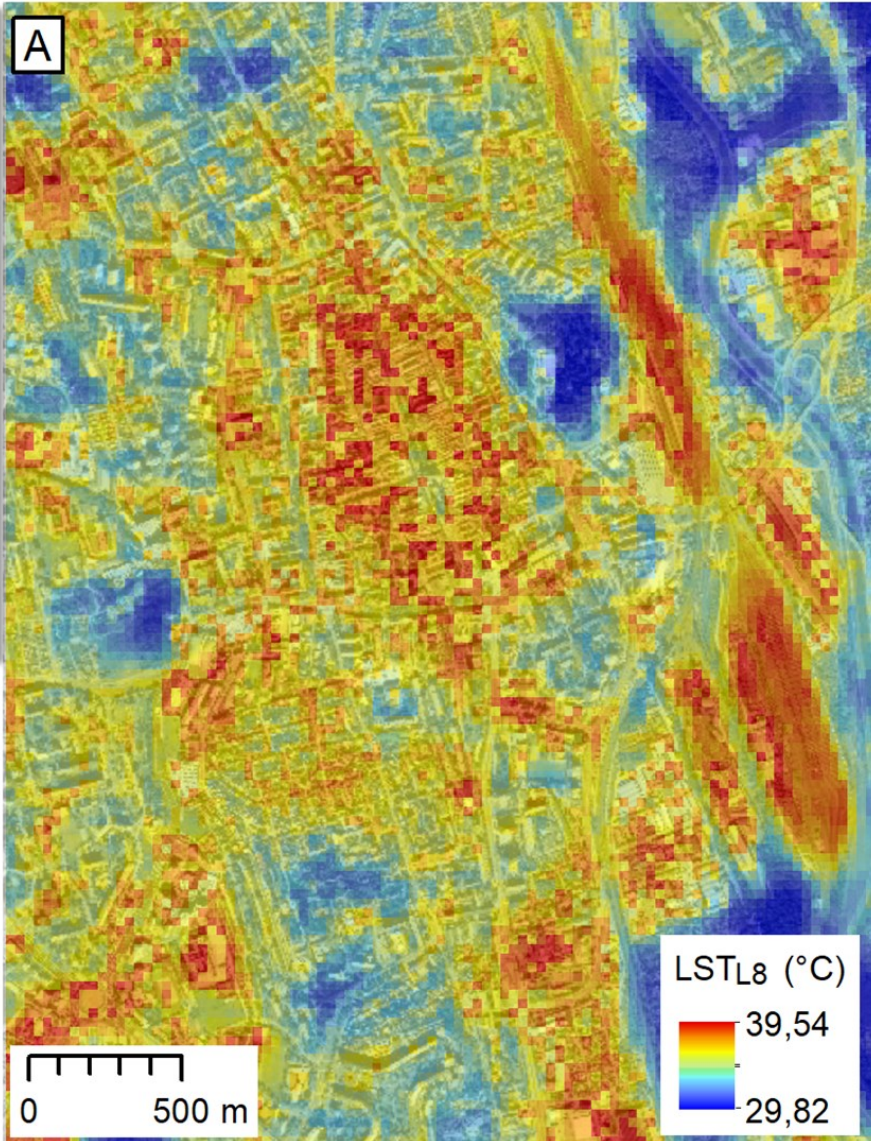
**(D)** 250 m





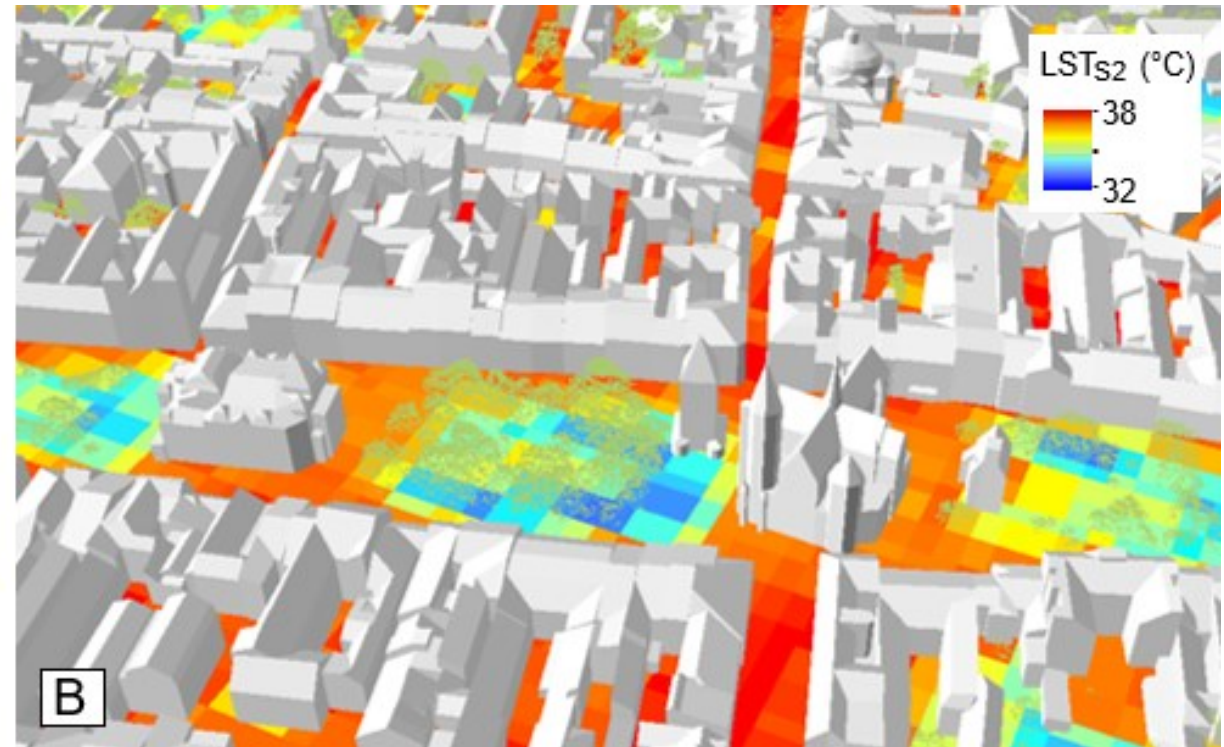
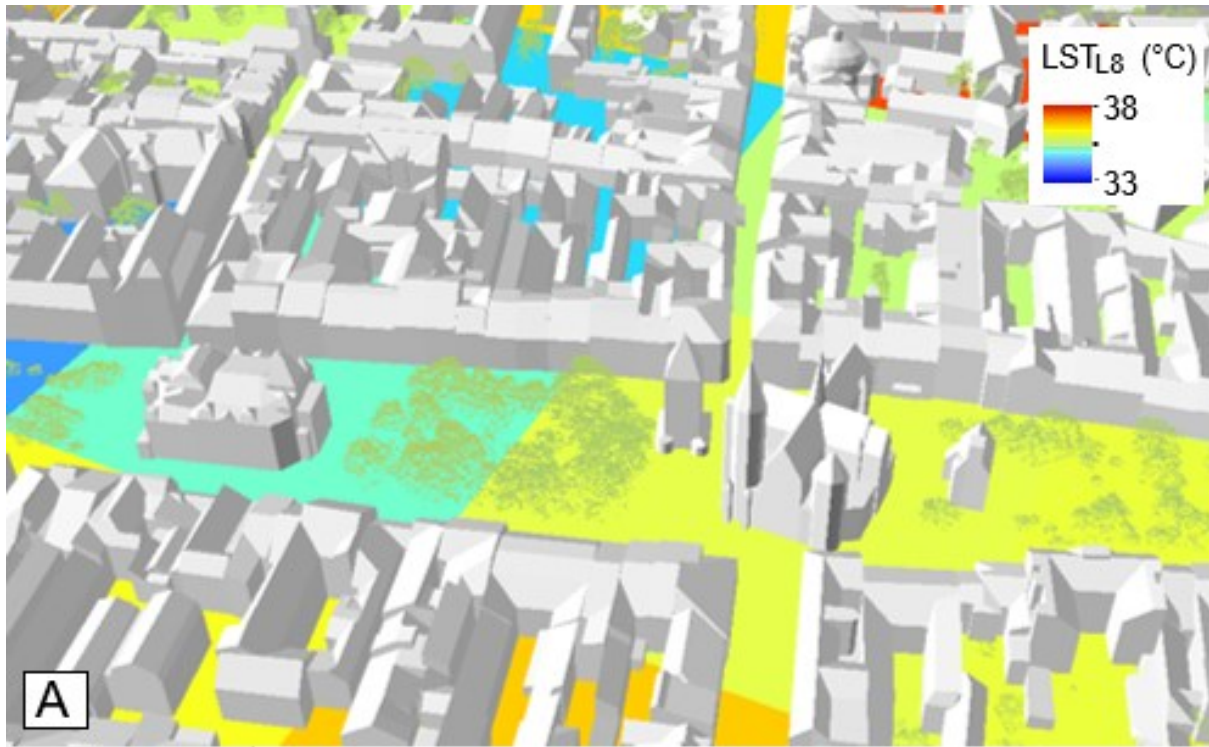
# Multispektrálne skenovanie – priestorové rozlíšenie

LST Landsat 8 – 30 m rozlíšenie

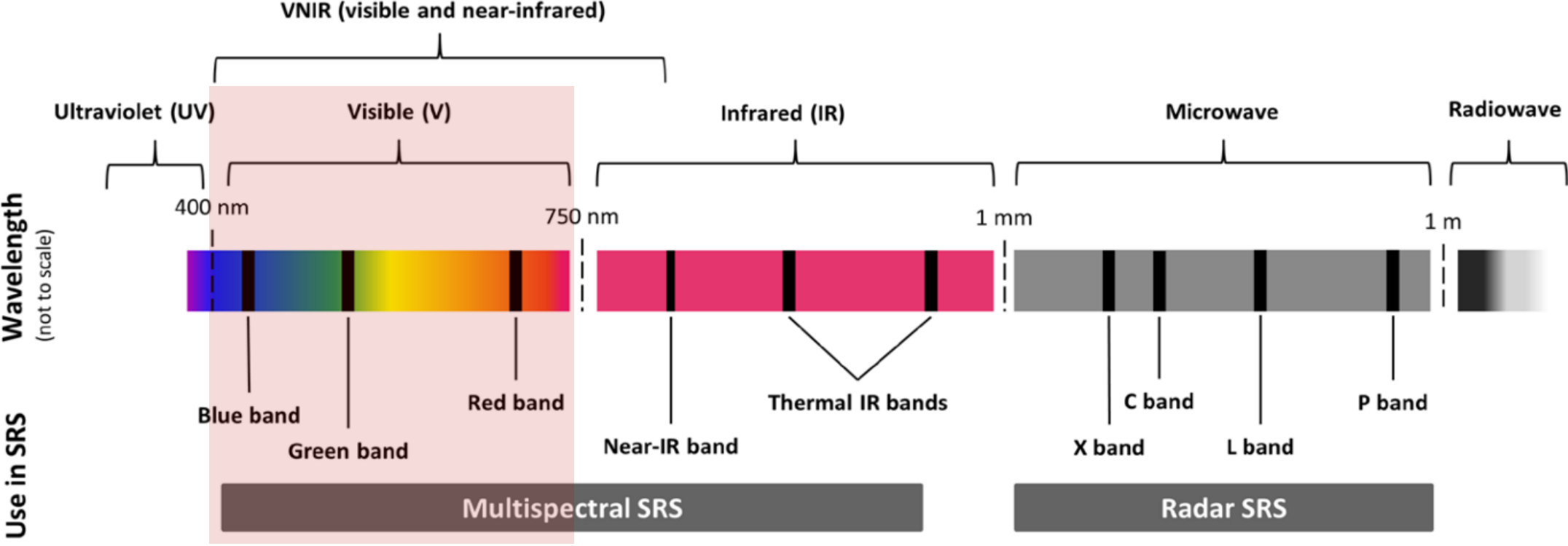


LST po downscalingu – 10 m rozlíšenie

# Multispektrálne skenovanie – priestorové rozlíšenie

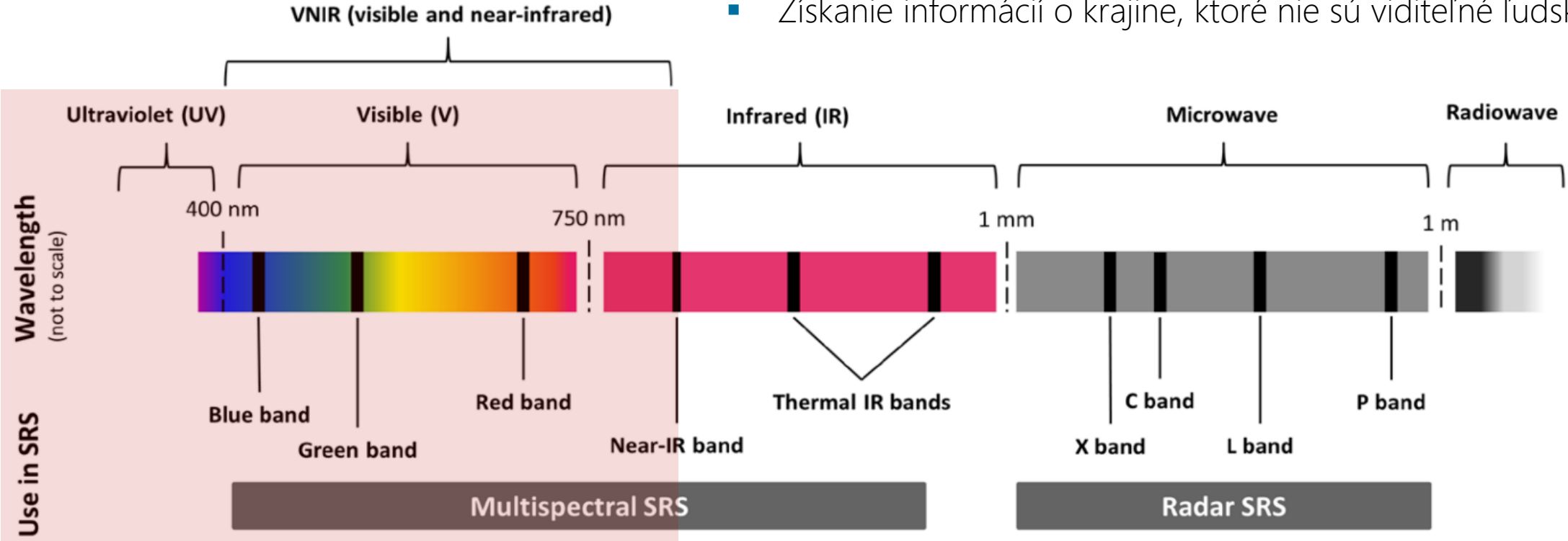


# Multispektrálne skenovanie – spektrálne rozlíšenie



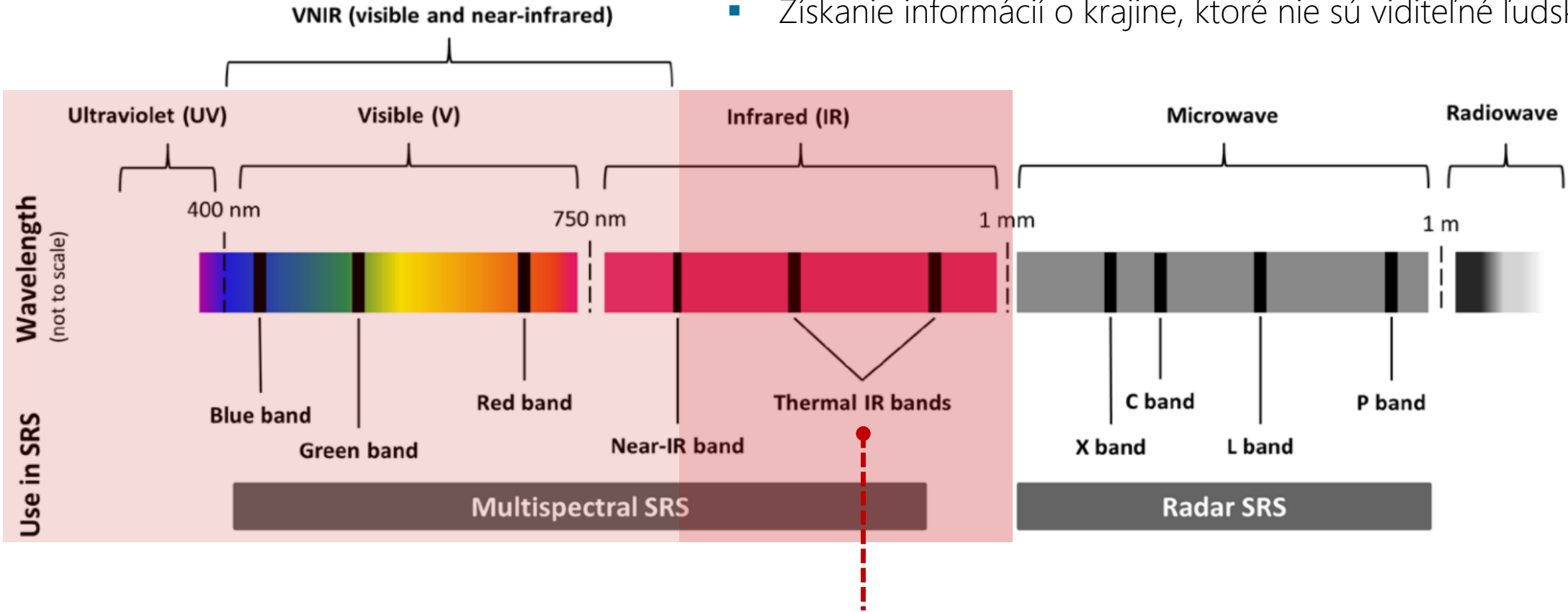
# Multispektrálne skenovanie – spektrálne rozlíšenie

- Získanie informácií o krajine, ktoré nie sú viditeľné ľudským okom



# Multispektrálne skenovanie – spektrálne rozlíšenie

- Získanie informácií o krajine, ktoré nie sú viditeľné ľudským okom



- Odvodenie teploty povrchu (LST)

# Multispektrálne skenovanie – rádiometrické rozlíšenie



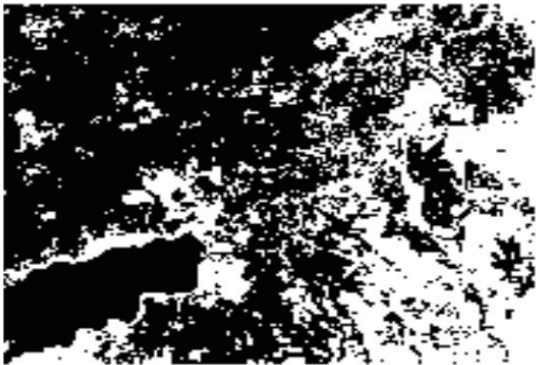
16 Values (4 bit)



8 Values (3 bit)



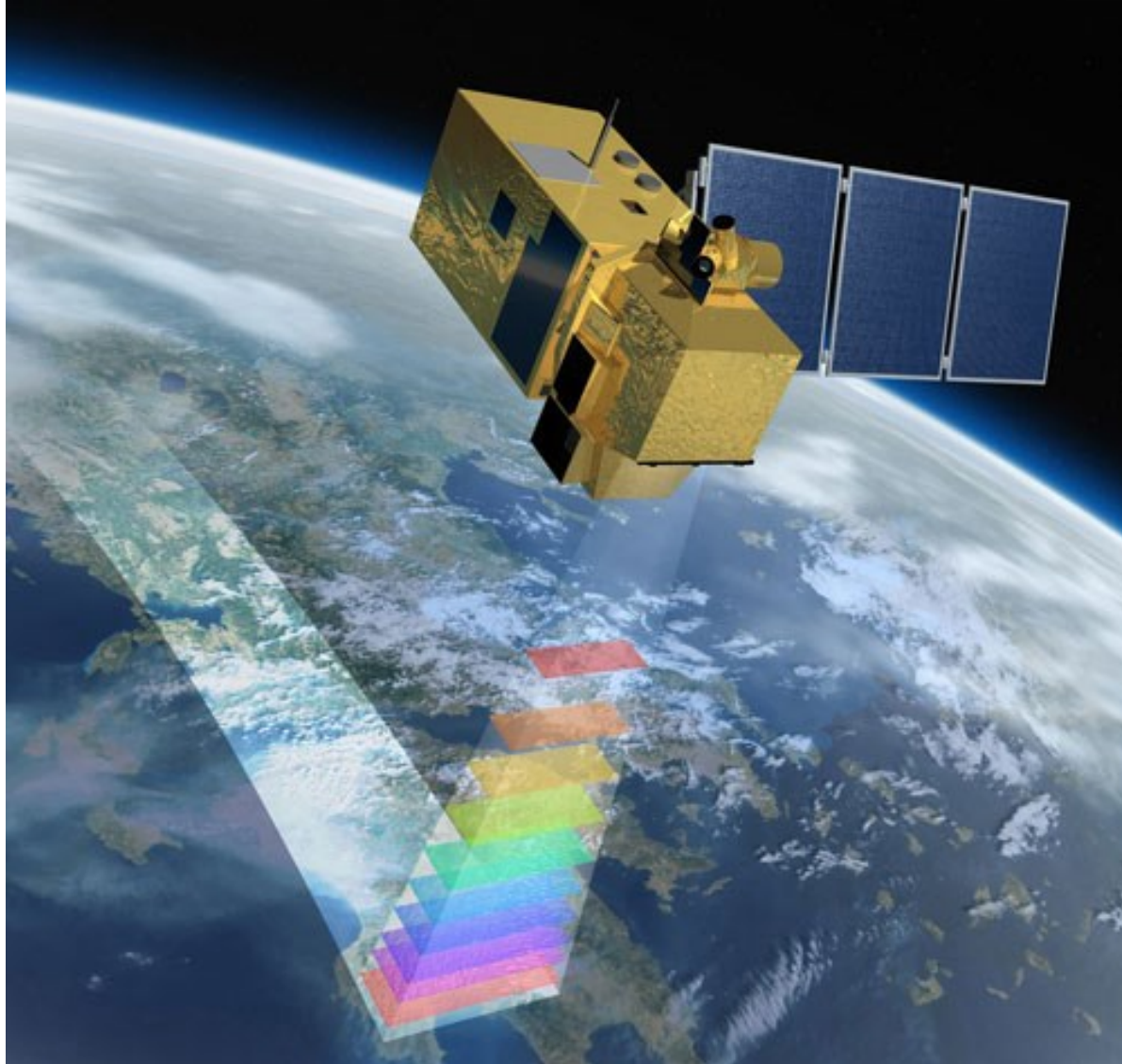
4 Values (2 bit)



2 Values (1 bit)



# Multispektrálne skenovanie – príklad rozlíšení

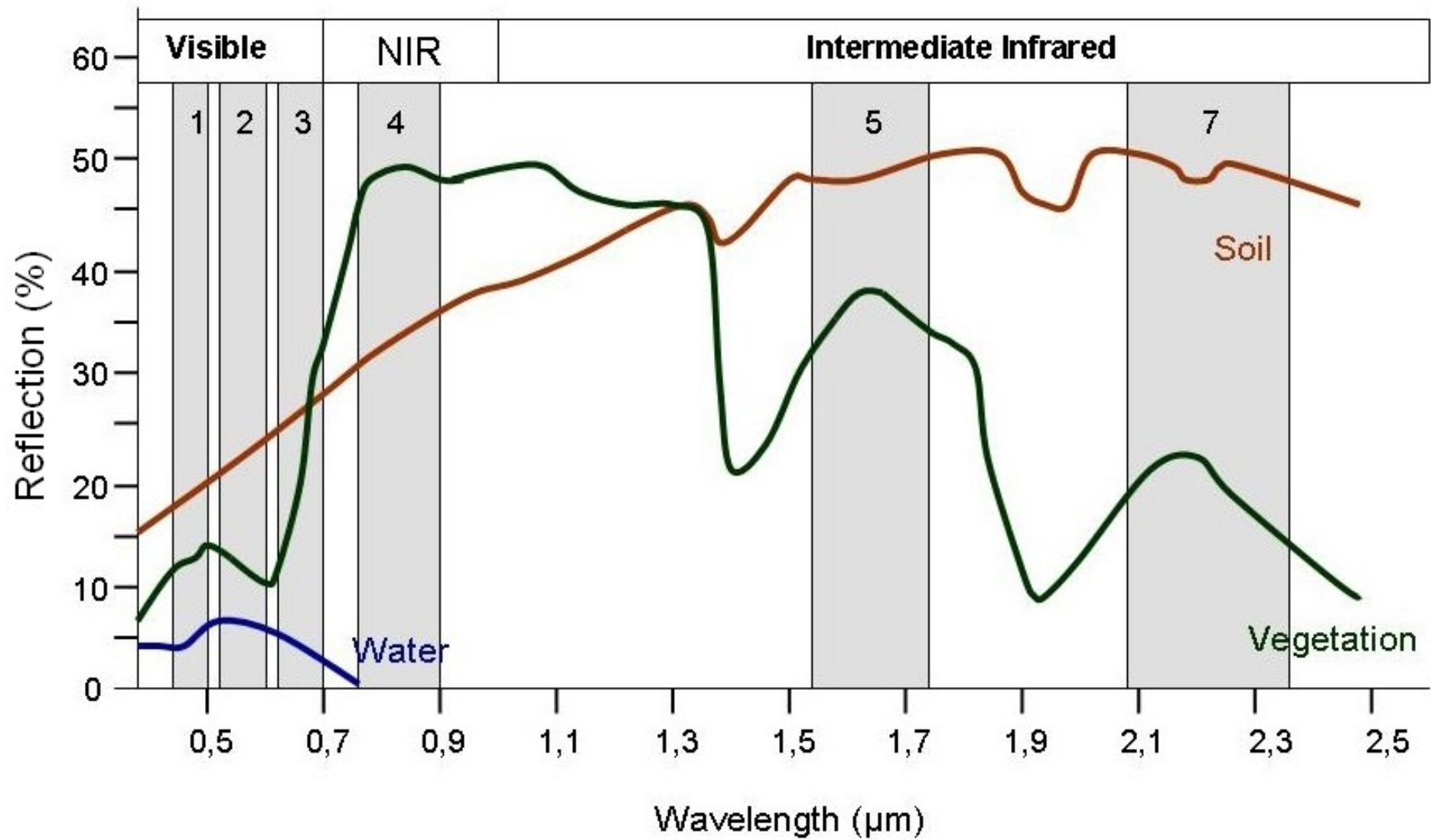


## Landsat 8

- snímkovanie v 16-dňových intervaloch
- senzor aj pre termálne snímanie
- 30 m rozlíšenie

## Sentinel-2A (ESA)

- snímkovanie v 10-dňových intervaloch
- senzor MSI (z ang. Multi-Spectral Instrument)
- 10 m rozlíšenie





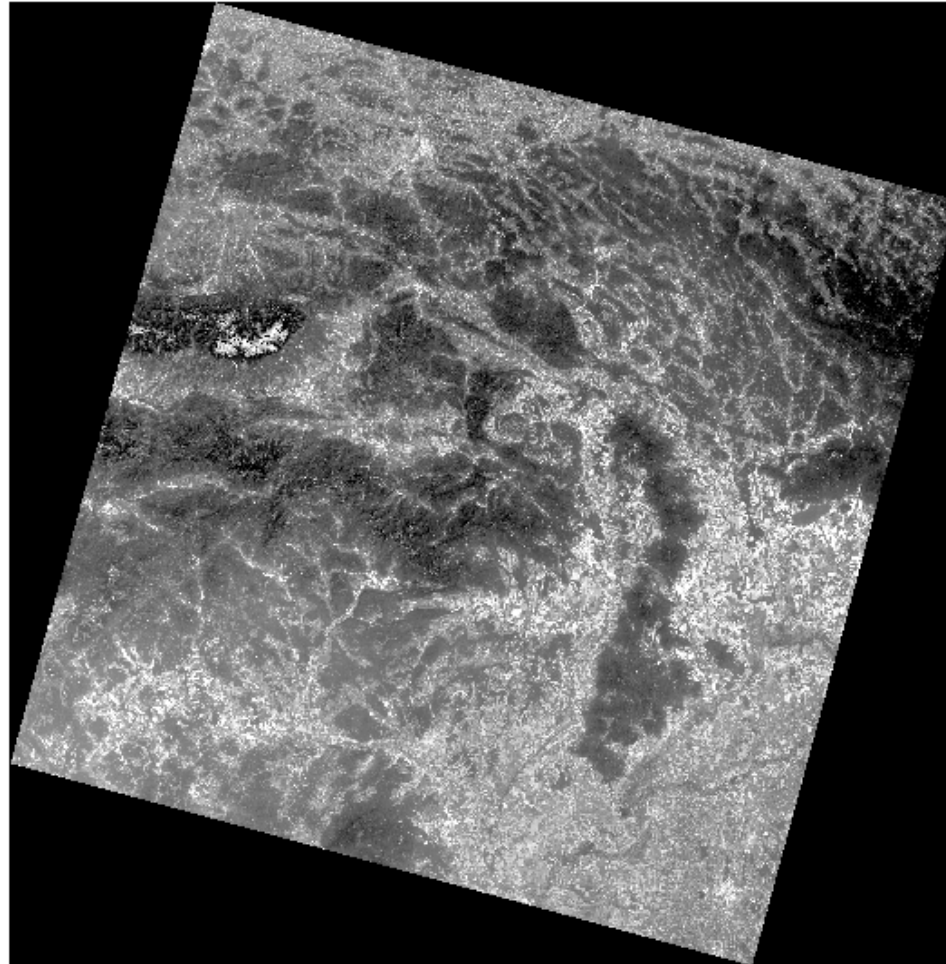
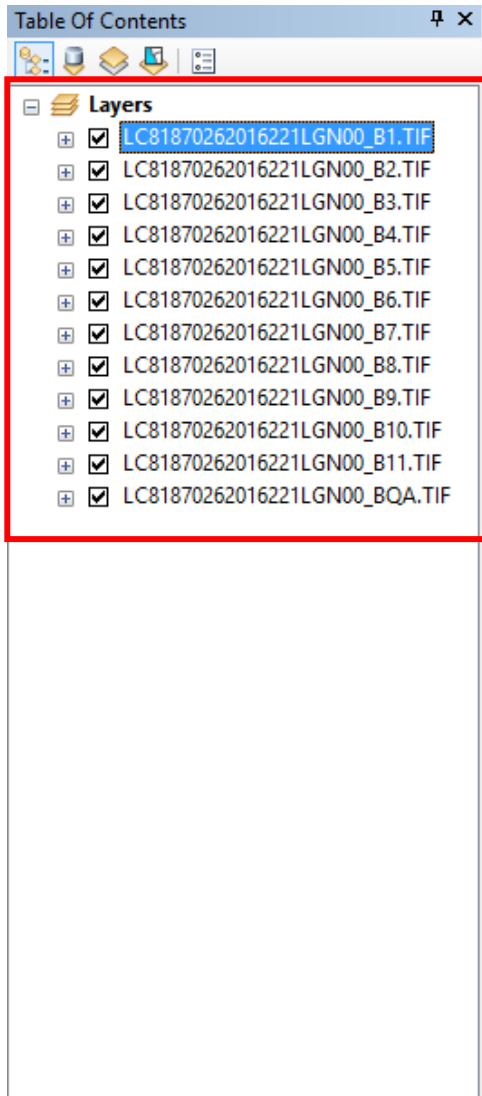
<b>Landsat 7 Enhanced Thematic Mapper Plus (ETM+)</b>	<b>Bands</b>	<b>Wavelength (micrometers)</b>	<b>Resolution (meters)</b>
	Band 1 - Blue	0.45-0.52	30
	Band 2 - Green	0.52-0.60	30
	Band 3 - Red	0.63-0.69	30
	Band 4 - Near Infrared (NIR)	0.77-0.90	30
	Band 5 - Shortwave Infrared (SWIR) 1	1.55-1.75	30
	Band 6 - Thermal	10.40-12.50	60 * (30)
	Band 7 - Shortwave Infrared (SWIR) 2	2.09-2.35	30
	Band 8 - Panchromatic	.52-.90	15

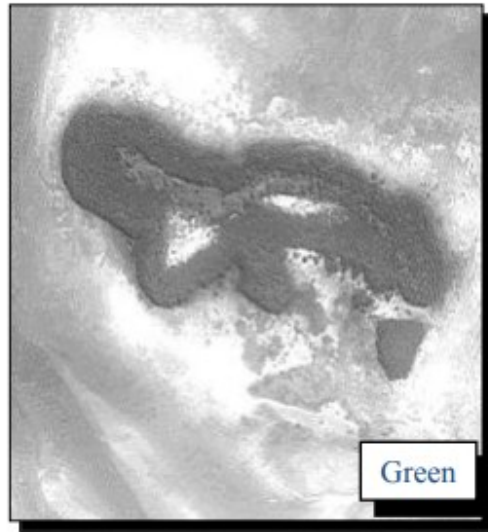
\* ETM+ Band 6 is acquired at 60-meter resolution, but products are resampled to 30-meter pixels.

<b>Landsat 8 Operational Land Imager (OLI) and Thermal Infrared Sensor (TIRS)</b>	<b>Bands</b>	<b>Wavelength (micrometers)</b>	<b>Resolution (meters)</b>
	Band 1 - Ultra Blue (coastal/aerosol)	0.435 - 0.451	30
	Band 2 - Blue	0.452 - 0.512	30
	Band 3 - Green	0.533 - 0.590	30
	Band 4 - Red	0.636 - 0.673	30
	Band 5 - Near Infrared (NIR)	0.851 - 0.879	30
	Band 6 - Shortwave Infrared (SWIR) 1	1.566 - 1.651	30
	Band 7 - Shortwave Infrared (SWIR) 2	2.107 - 2.294	30
	Band 8 - Panchromatic	0.503 - 0.676	15
	Band 9 - Cirrus	1.363 - 1.384	30
	Band 10 - Thermal Infrared (TIRS) 1	10.60 - 11.19	100 * (30)
Band 11 - Thermal Infrared (TIRS) 2	11.50 - 12.51	100 * (30)	

\* TIRS bands are acquired at 100 meter resolution, but are resampled to 30 meter in delivered data product.

### 3.1 Súbor rozzipujeme a otvoríme v ArcMap. Spektrálne pásma zoradíme podľa poradia.

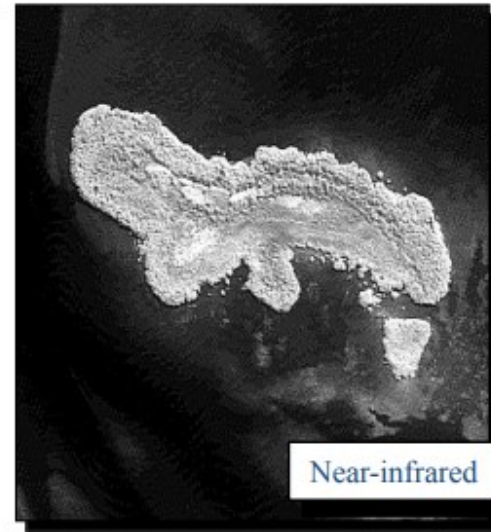




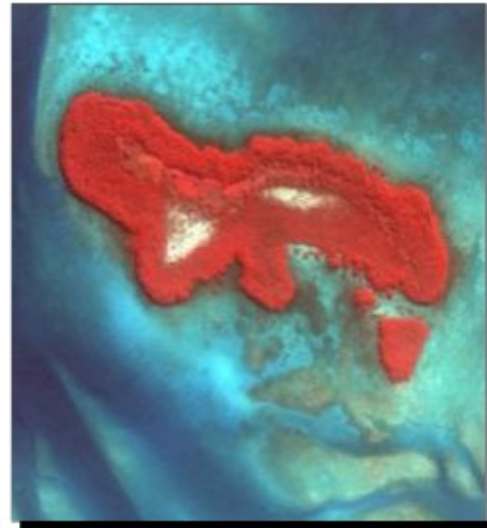
Green



Red



Near-infrared



Color composite  
RGB = green, red, near-  
infrared

Jensen, 2007

Landsat Thematic Mapper (TM) and Enhanced Thematic Mapper Plus (ETM+) Bands

Band	Name	Band Width ( $\lambda$ , $\mu\text{m}$ )	Spatial Resolution
1	Blue	0.45-0.515	30 m
2	Green	0.525-0.605	30 m
3	Red	0.63-0.69	30 m
4	Near Infrared	0.75-0.90	30 m
5	Shortwave IR-1	1.55-1.75	30 m
6	Thermal IR	10.4-12.5	60 m / 120 m*
7	Shortwave IR-2	2.09-2.35	30 m
8*	Panchromatic	0.52-0.9	15 m

3.2 Sledovanie vlastností jednotlivých spektrálnych pásem, viac: <https://landsat.gsfc.nasa.gov/landsat-8/landsat-8-bands/>

### 3.3 Zistíme rozlíšenie záznamu pre jednotlivé pásma.

The screenshot displays the ArcGIS interface with the 'Table Of Contents' and 'Layers' panels on the left. A context menu is open over the 'LC81870262016221LGN' layer, with 'Properties...' selected. The 'Layer Properties' dialog box is open, showing the 'Raster Information' tab. The 'Data Source' section is expanded, showing the file path for the raster data.

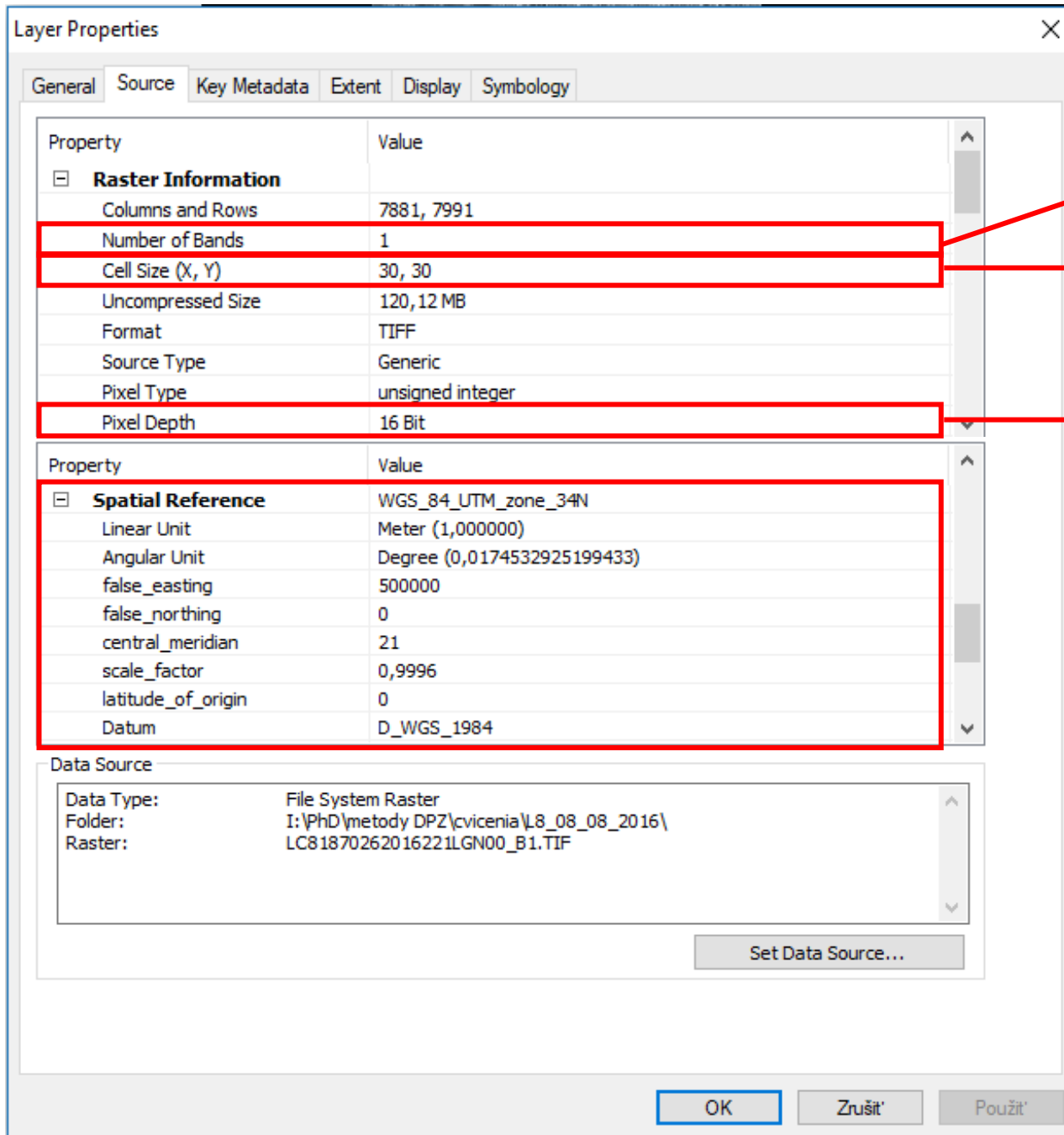
Property	Value
<b>Raster Information</b>	
Columns and Rows	7881, 7991
Number of Bands	1
Cell Size (X, Y)	30, 30
Uncompressed Size	120, 12 MB
Format	TIFF
Source Type	Generic
Pixel Type	unsigned integer
Pixel Depth	16 Bit

Data Source	
Data Type:	File System Raster
Folder:	I:\PhD\metody DPZ\cvicenia\L8_08_08_2016\
Raster:	LC81870262016221LGN00_B1.TIF

470774,741 5287048,577 Meters

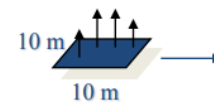
Viac info: <https://landsat.usgs.gov/what-are-best-spectral-bands-use-my-study>



**Spektrálne rozlíšenie**

**Priestorové rozlíšenie**

**Rádiometrické rozlíšenie**



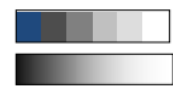
- **1. priestorová** (mm, cm, dc, m, km)

- **2. spektrálna** (spektrálny rozsah)



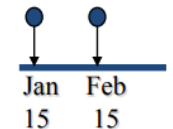
- VID, IČ, termálne, radar

- **3. rádiometrická** (rozdelenie toku radiácie)



- elementárna jednotka <0, 255>

- **4. temporálna** (časový interval 2 záznamov)



- operatívnosť nosičov – lietadlá, družice

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Ďakujem za  
pozornosť 😊

Mgr. Katarína Onačillová

