

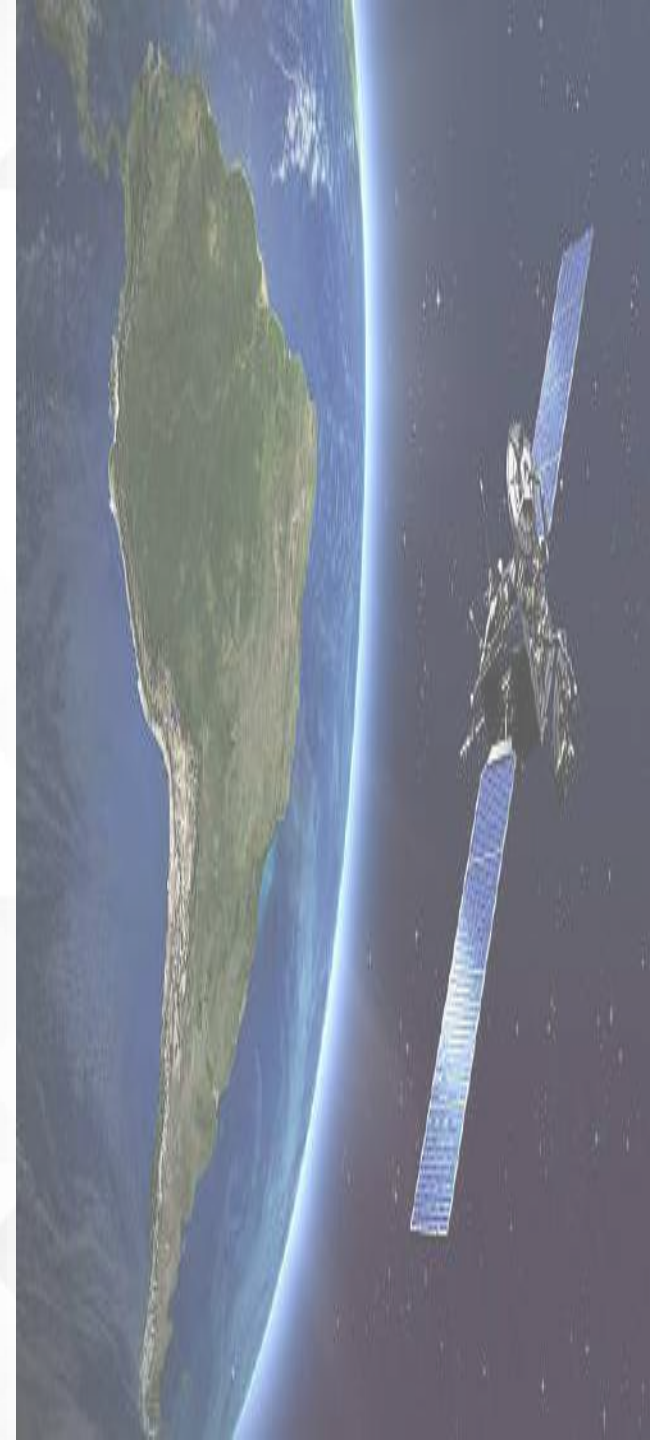


**CURSO DE
TECNOLOGIA ESPACIAL NA EDUCAÇÃO:
GEOPROCESSAMENTO**

**Sinal detectado pelo satélite,
Composições Coloridas das
Imagens de Satélites e suas
Aplicabilidades**

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São José dos Campos - SP
25 de Julho de 2022

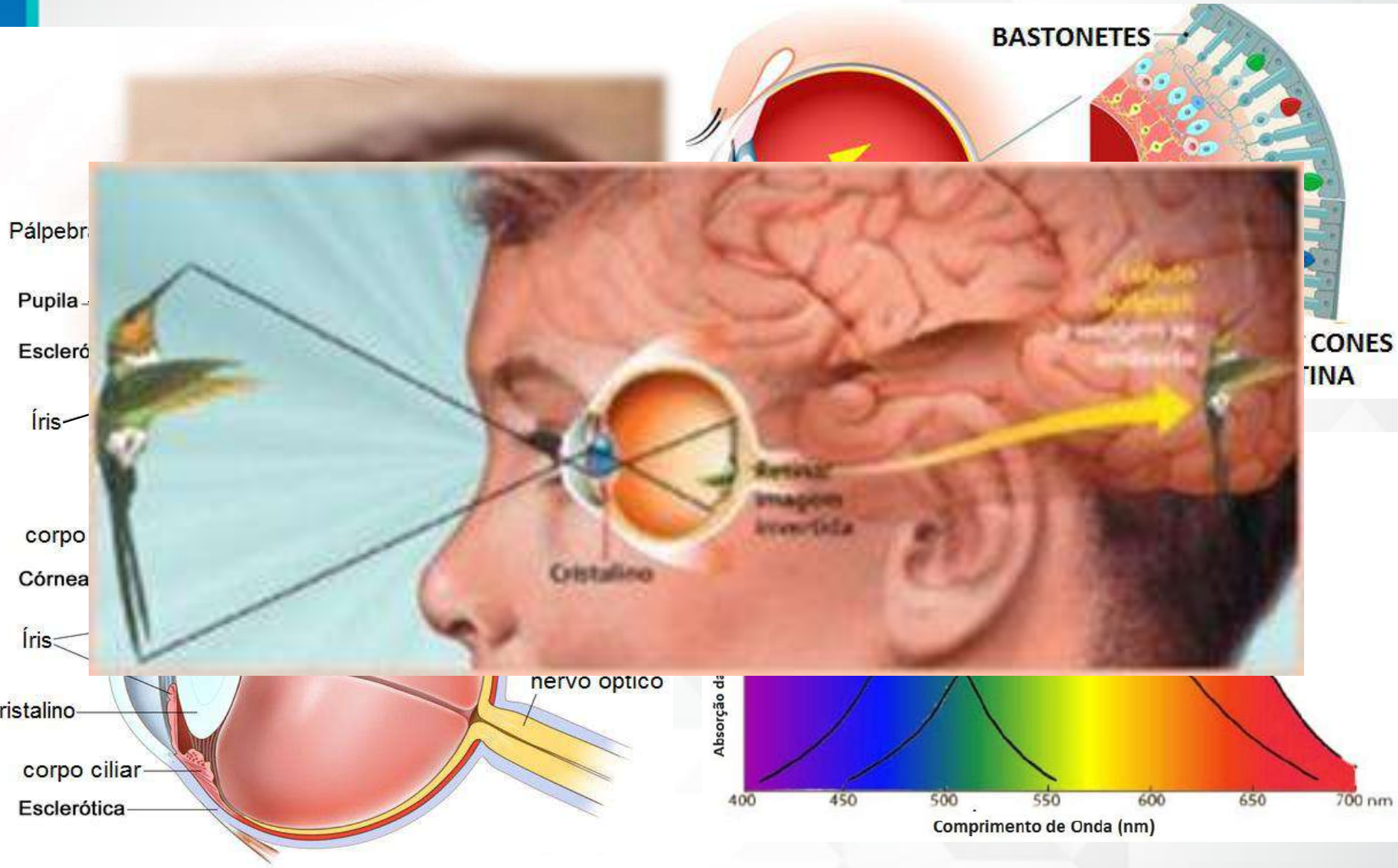


Sensoriamento Remoto

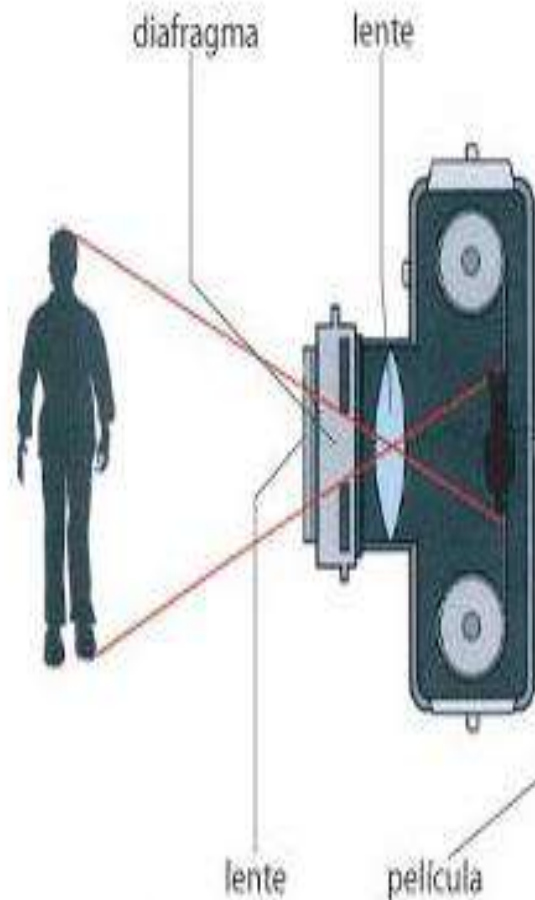
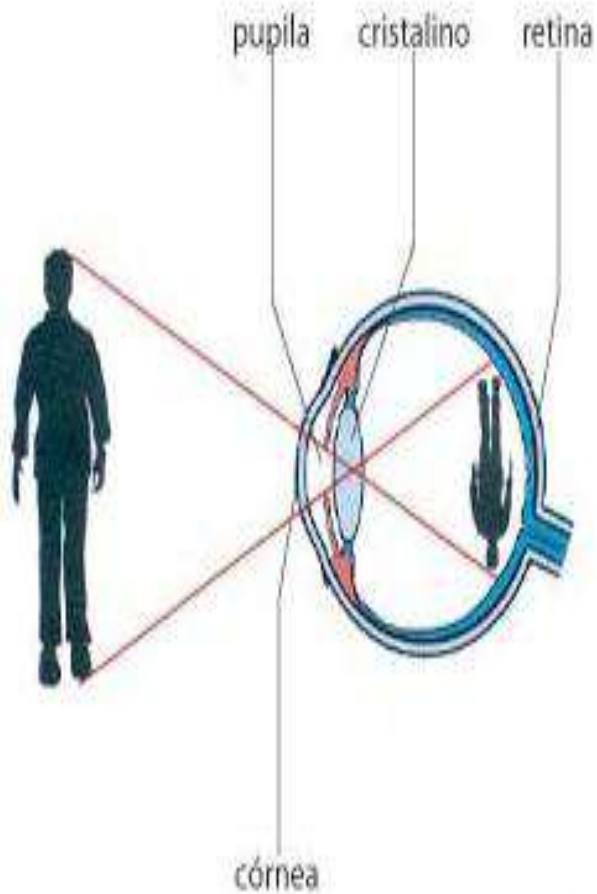
Técnica ou con
permite a obter
sobre objetos
Quem já fez uso?
com



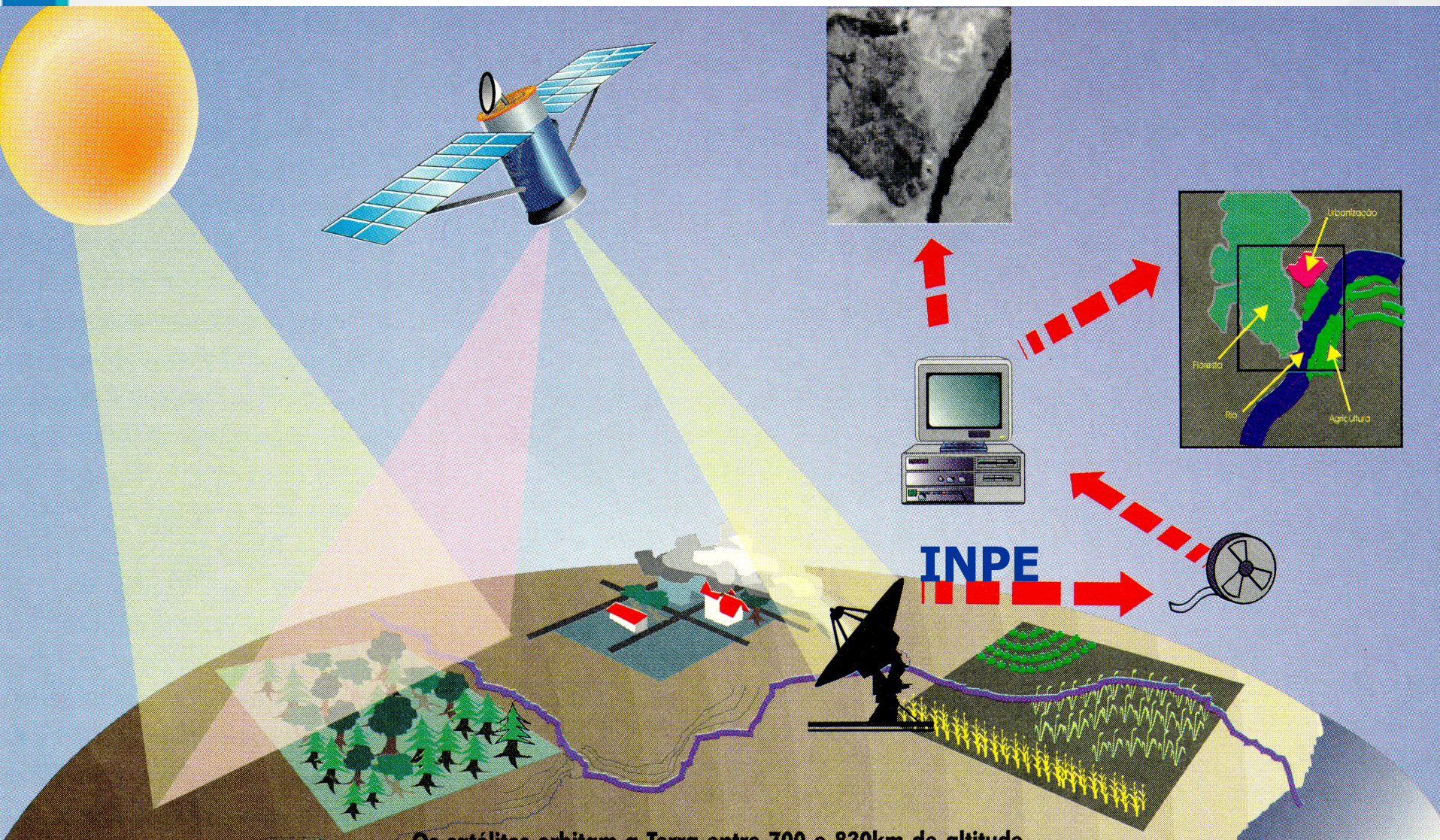
Olho humano



Olho humano x Máquina Fotográfica x Sensor



Sensoriamento Remoto



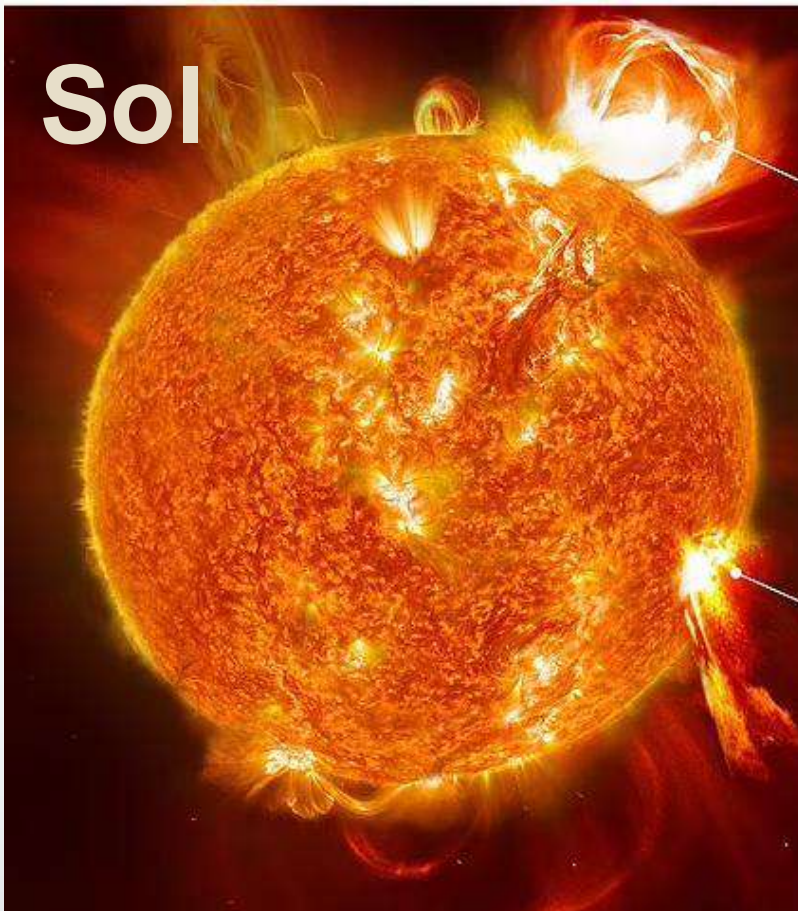
Os satélites orbitam a Terra entre 700 e 830km de altitude

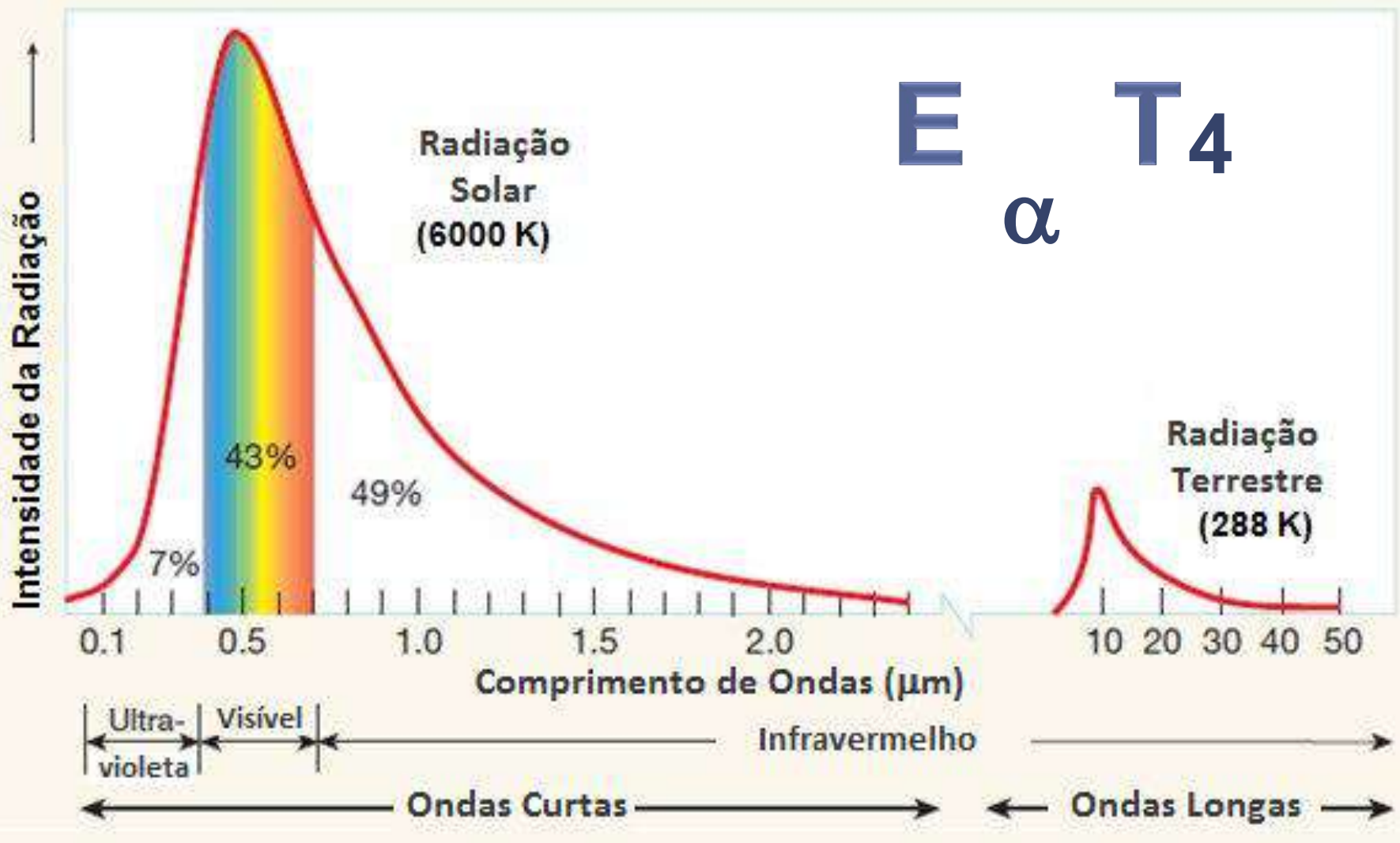
**Que energia é esta captada
pelos sensores orbitais?**

Principais Fontes de Energia

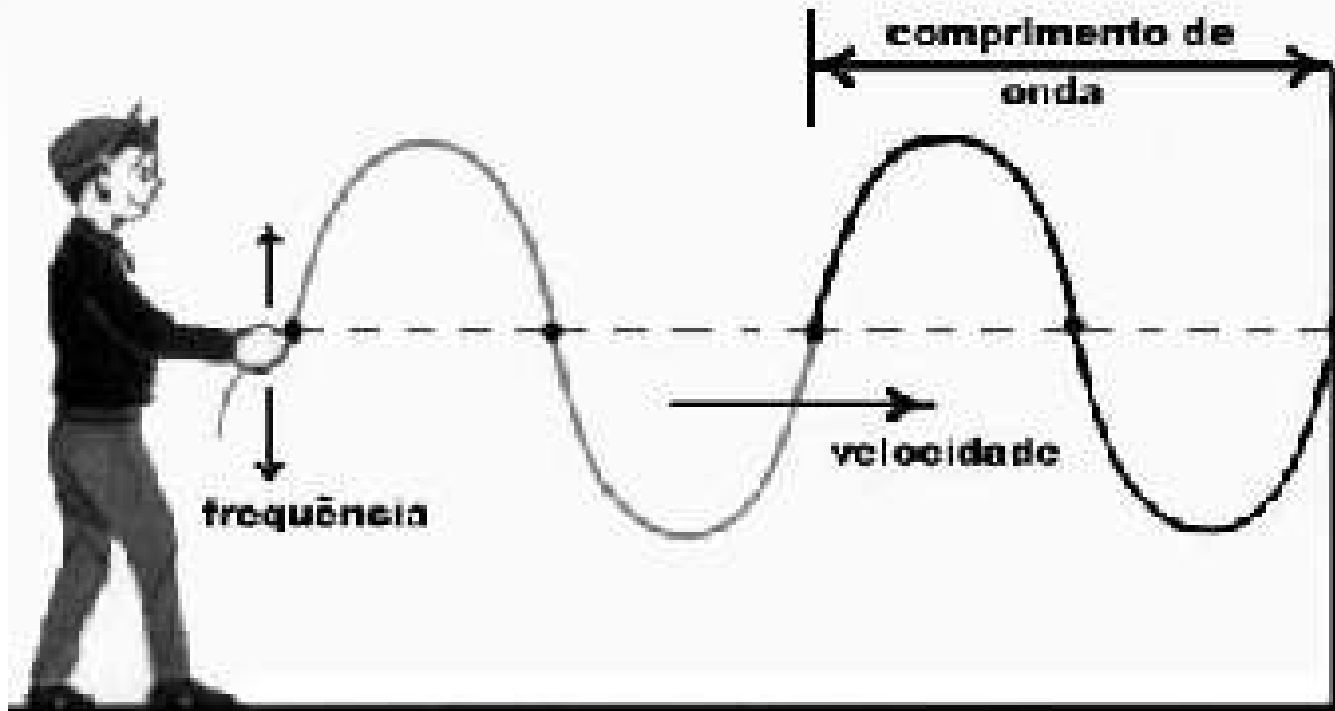
Todo corpo com temperatura acima de zero absoluto (0K)
emite energia eletromagnética

$$0 \text{ K} = - 273,16^{\circ}\text{C}$$





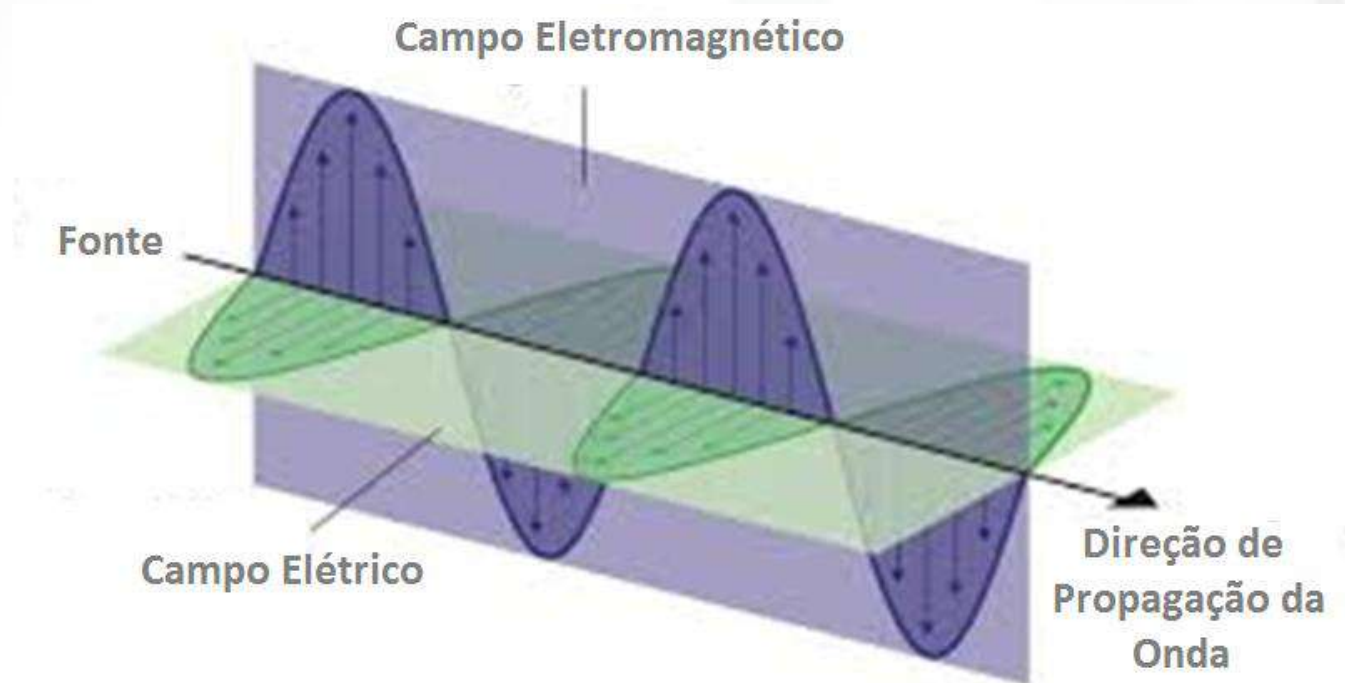
Características da onda



$$c = f \cdot \lambda$$

No caso da onda eletromagnética c é a velocidade de propagação da luz

Propagação da Energia Eletromagnética

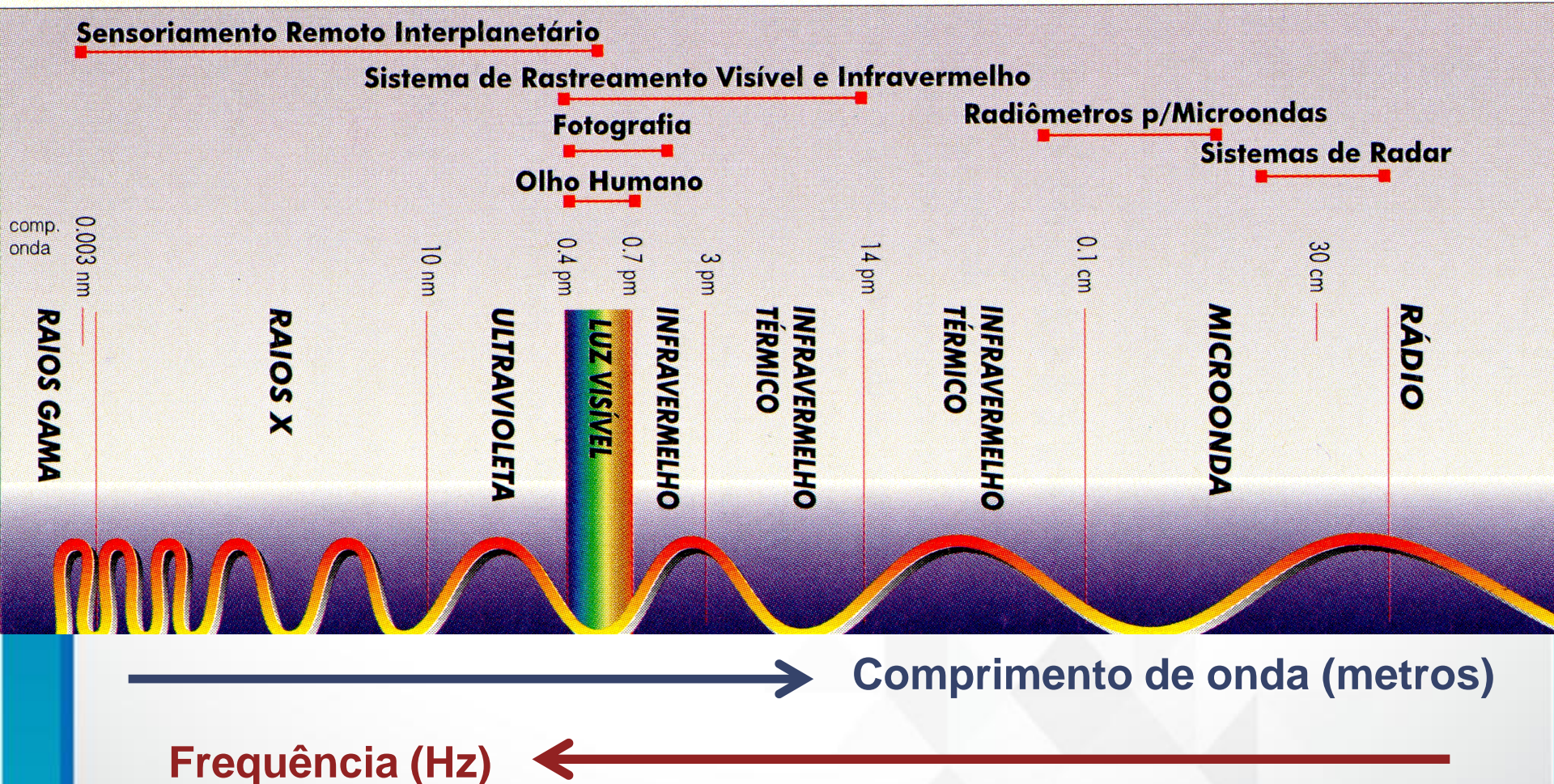


$$E = cte \cdot f \quad \text{ou} \quad E = cte \cdot c / \lambda$$

medida da capacidade da radiação de realizar trabalho físico, de aquecer um objeto ou causar mudança de estado da matéria

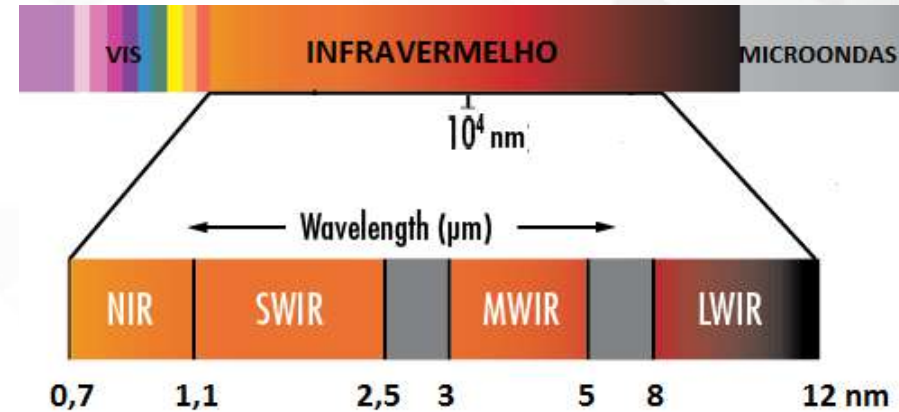
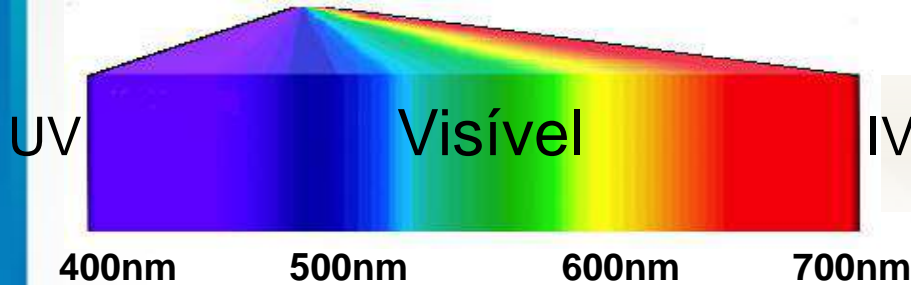
Espectro Eletromagnético

Regiões espectrais de interesse do Sensoriamento Remoto:
Ótico e Microondas



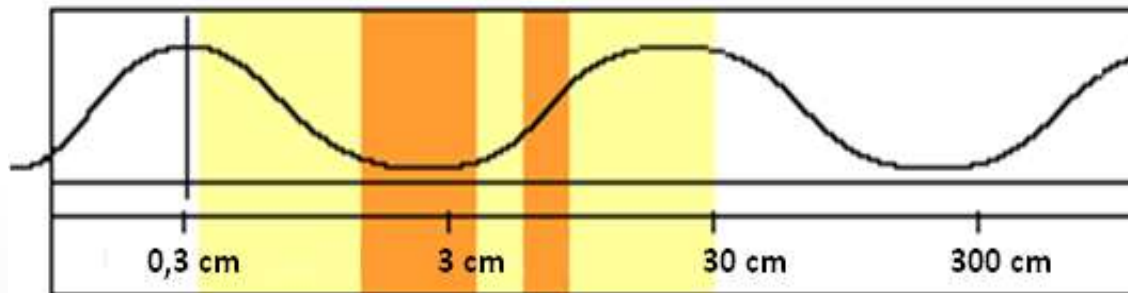
Regiões Espectrais

SENSORIAMENTO REMOTO PASSIVO



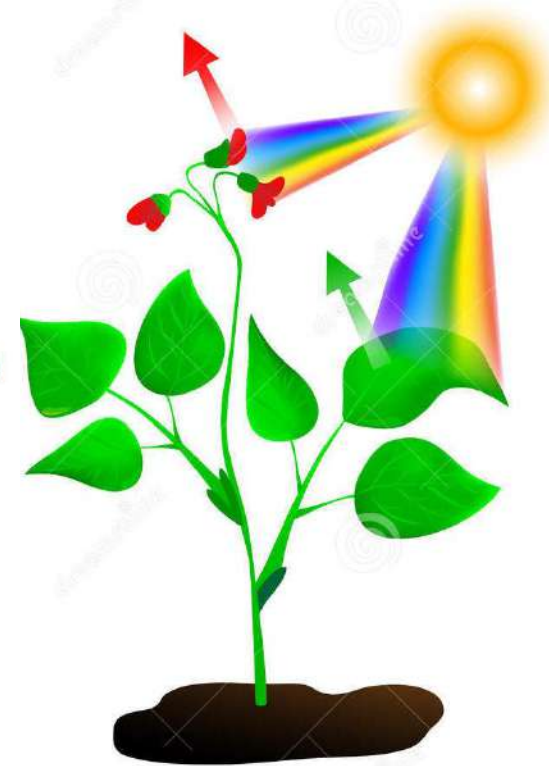
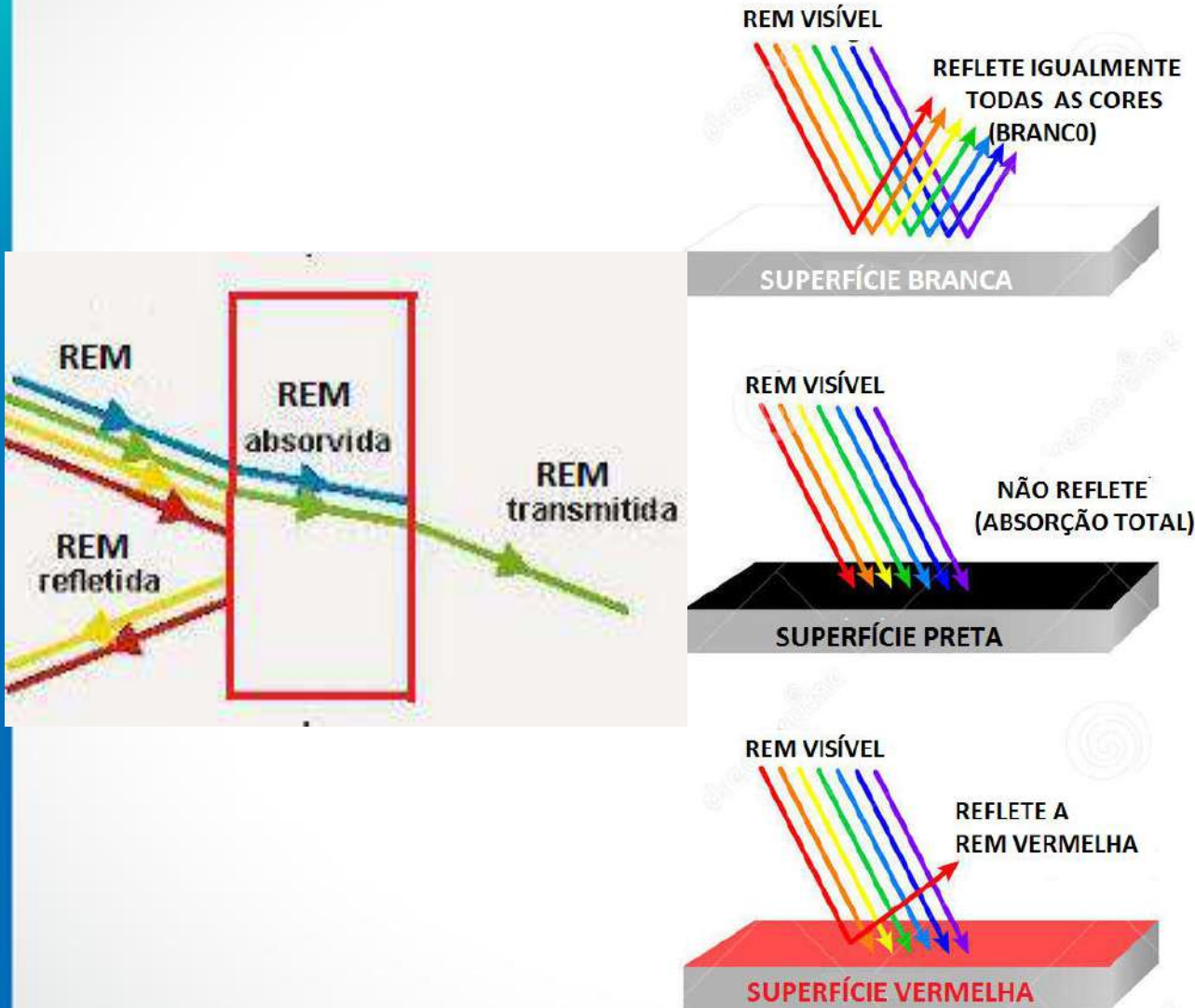
SENSORIAMENTO REMOTO ATIVO

MICROONDAS

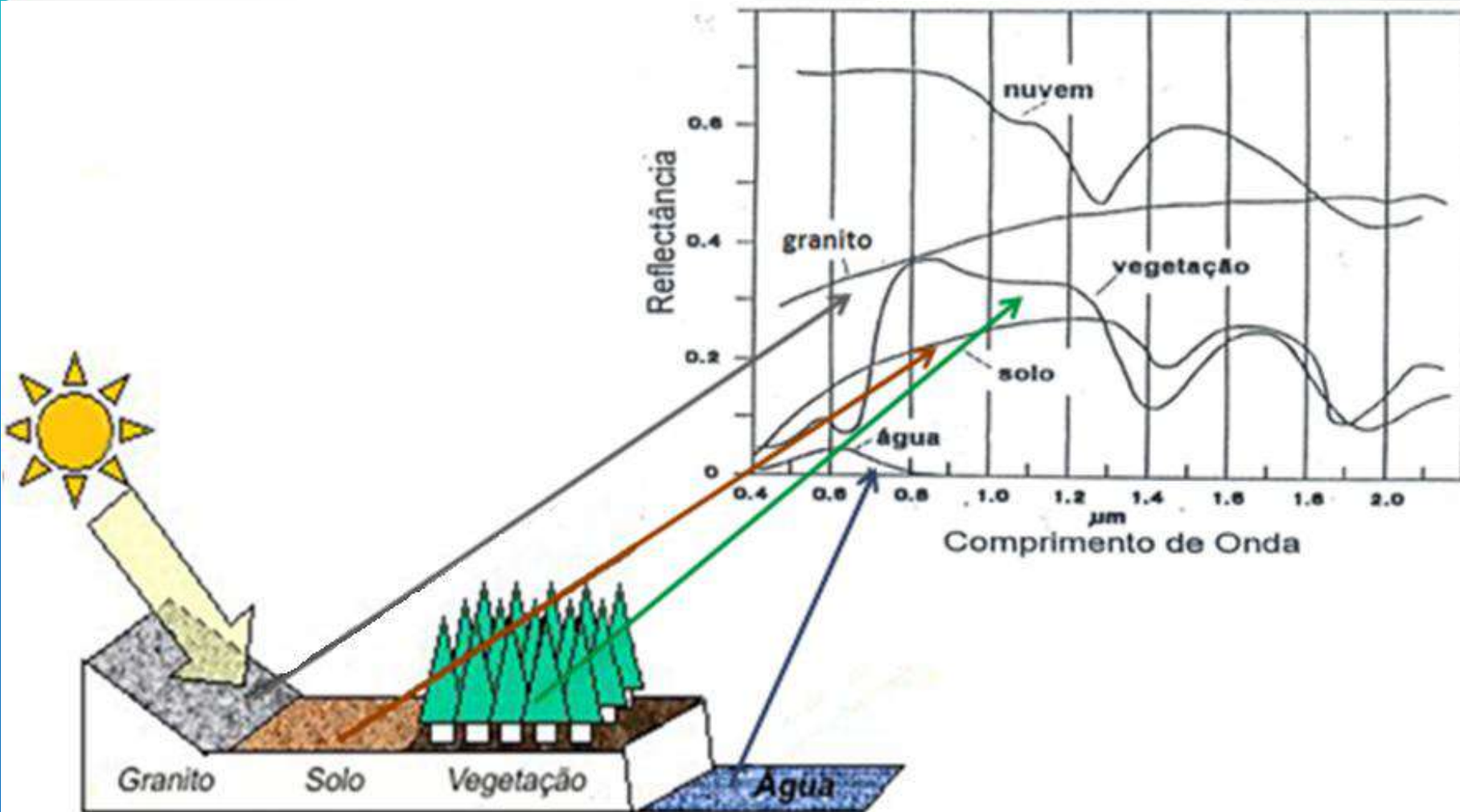


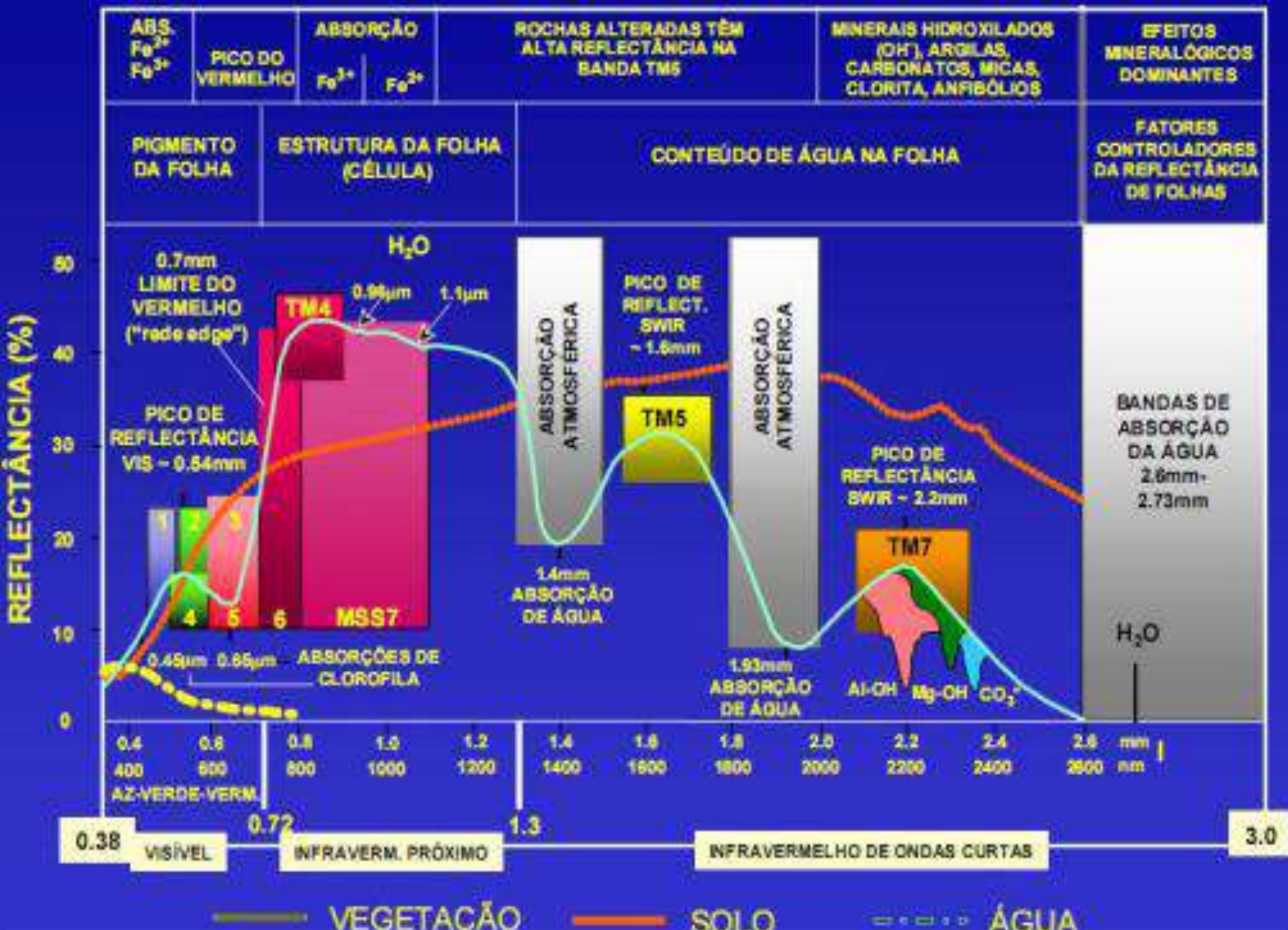
Interação

Energia Eletromagnética x Objeto



Espectro de Reflectância





Comportamento Espectral

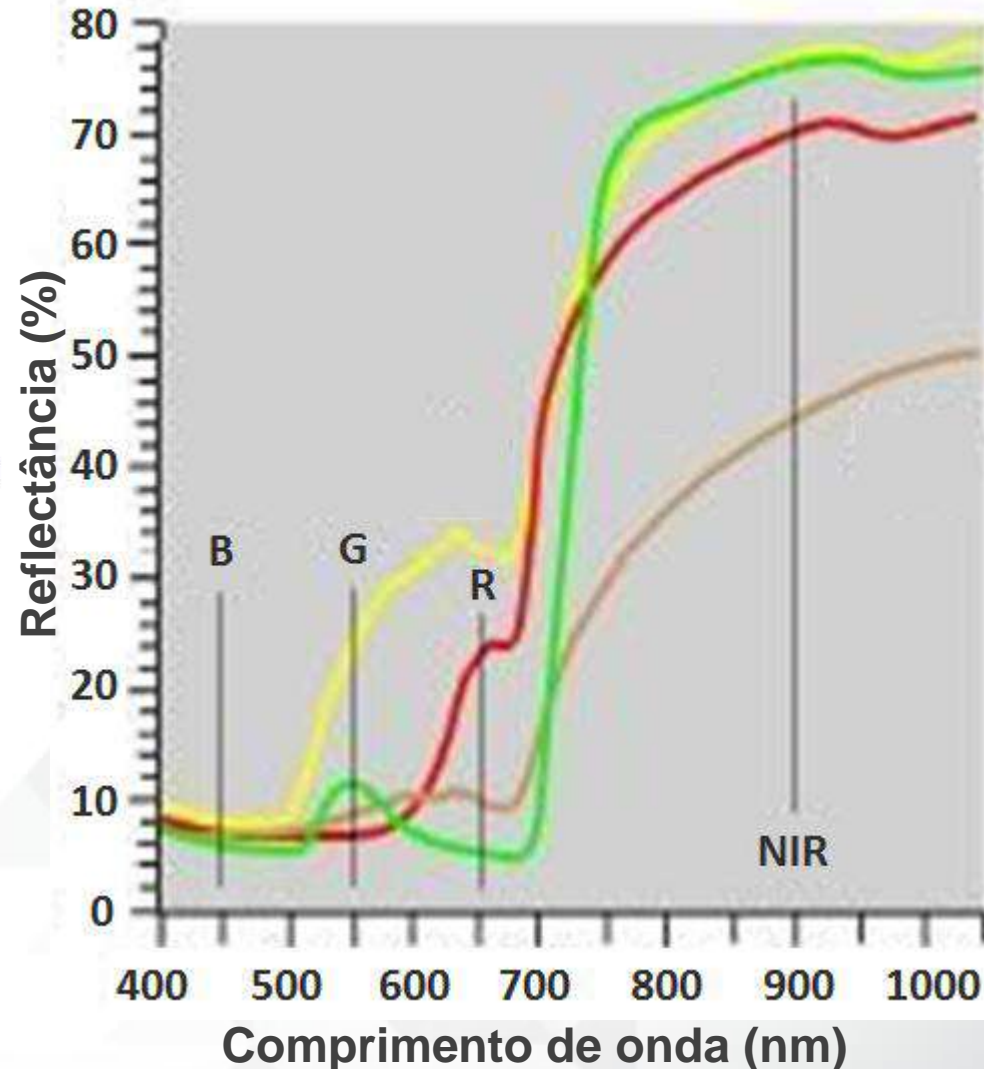
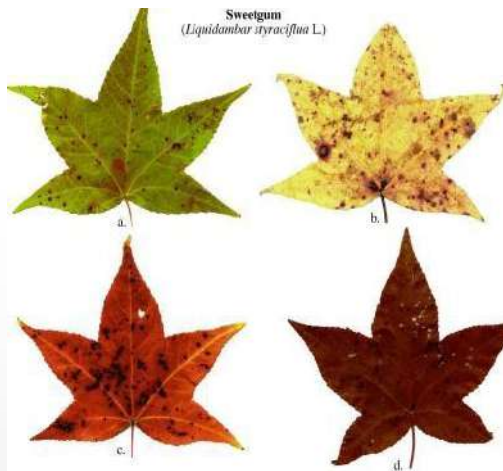
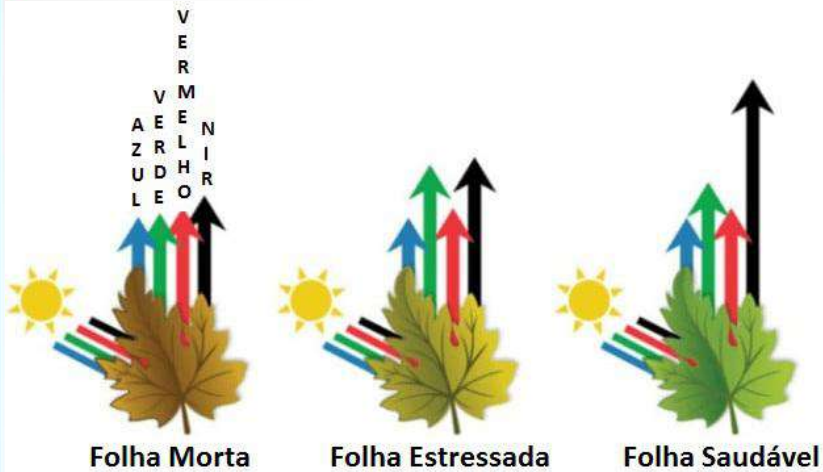
Vegetação sadia



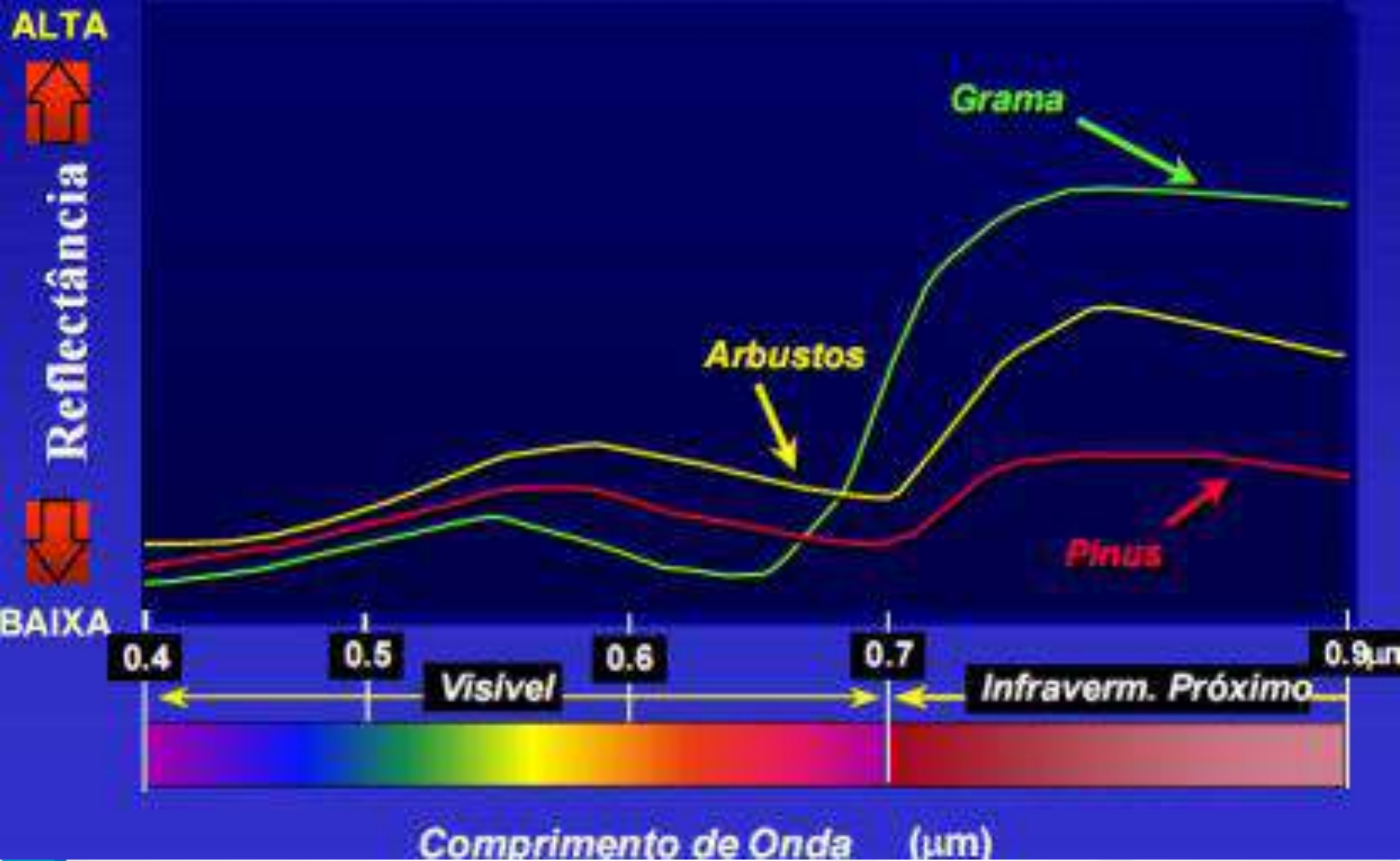
Rochas



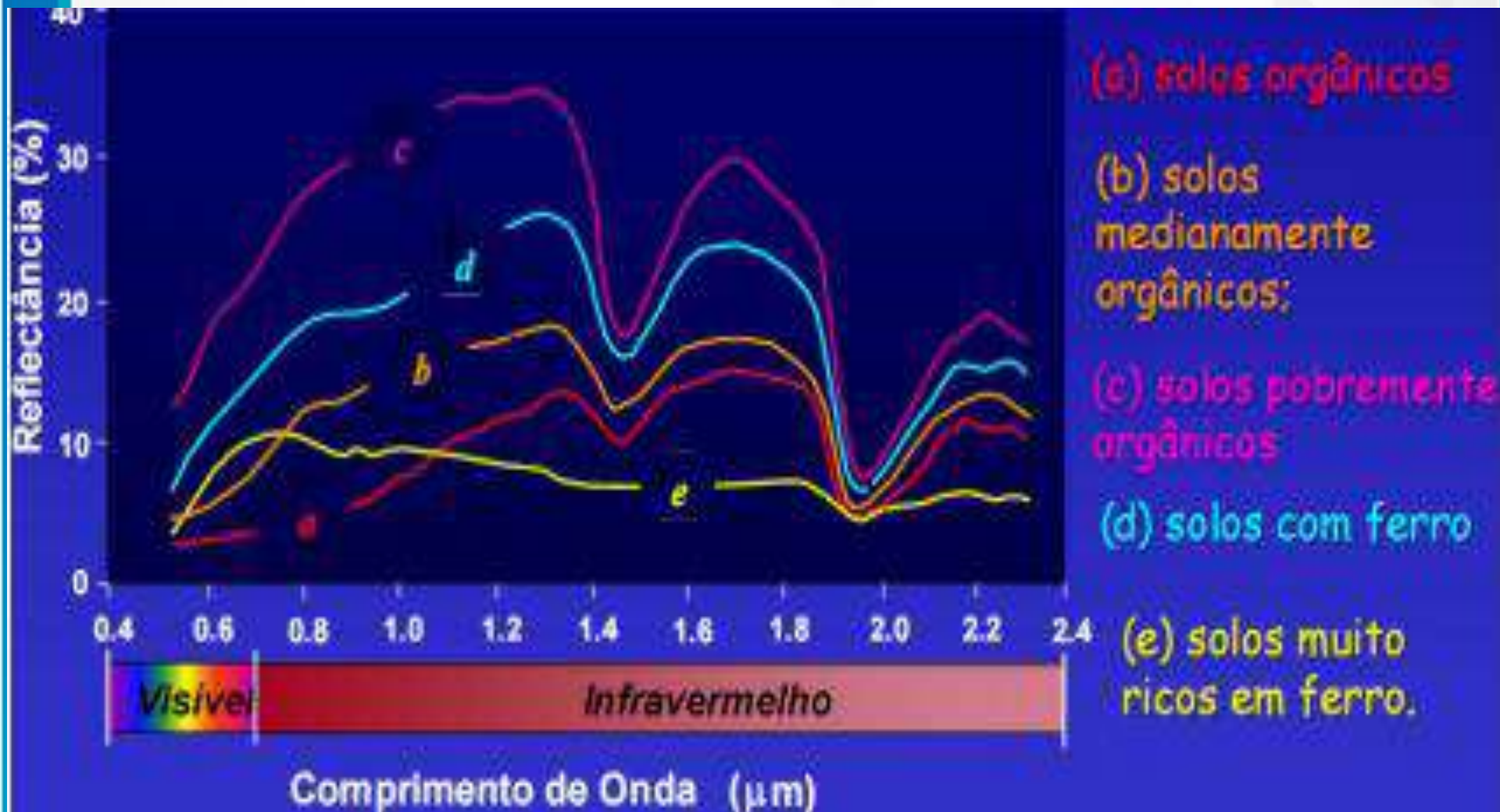
Reflectância Espectral de Folha em diferentes estágios



DISTINÇÃO REFLECTÂNCIA ESPECTRAL

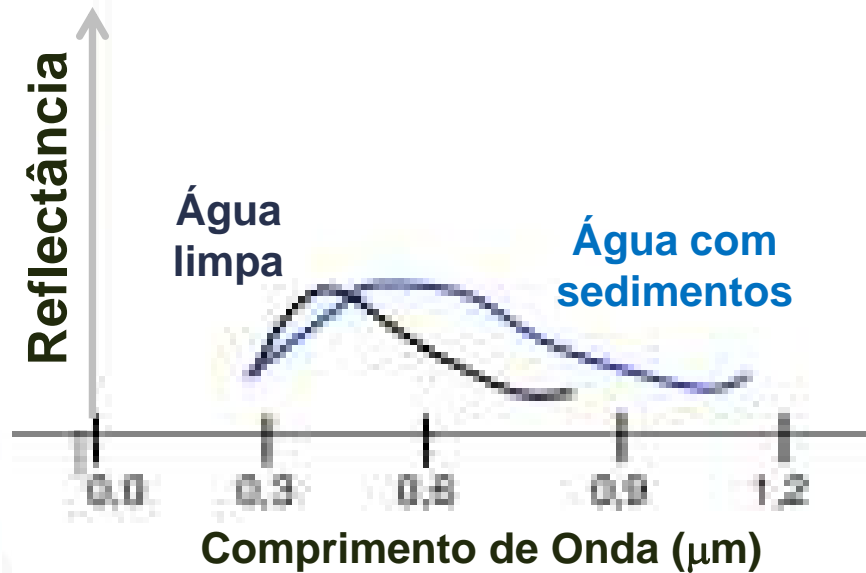
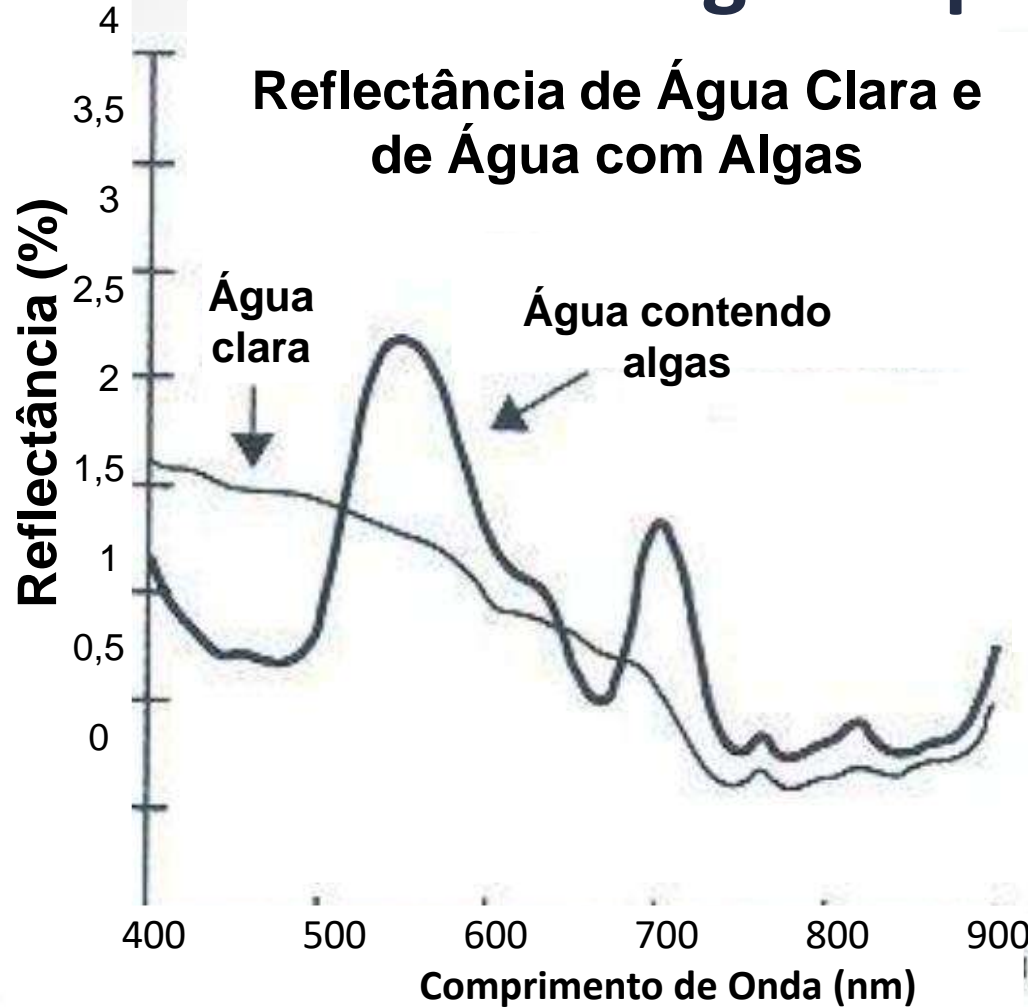


Influência da Matéria Orgânica e de Ferro no Comportamento Espectral de Solo



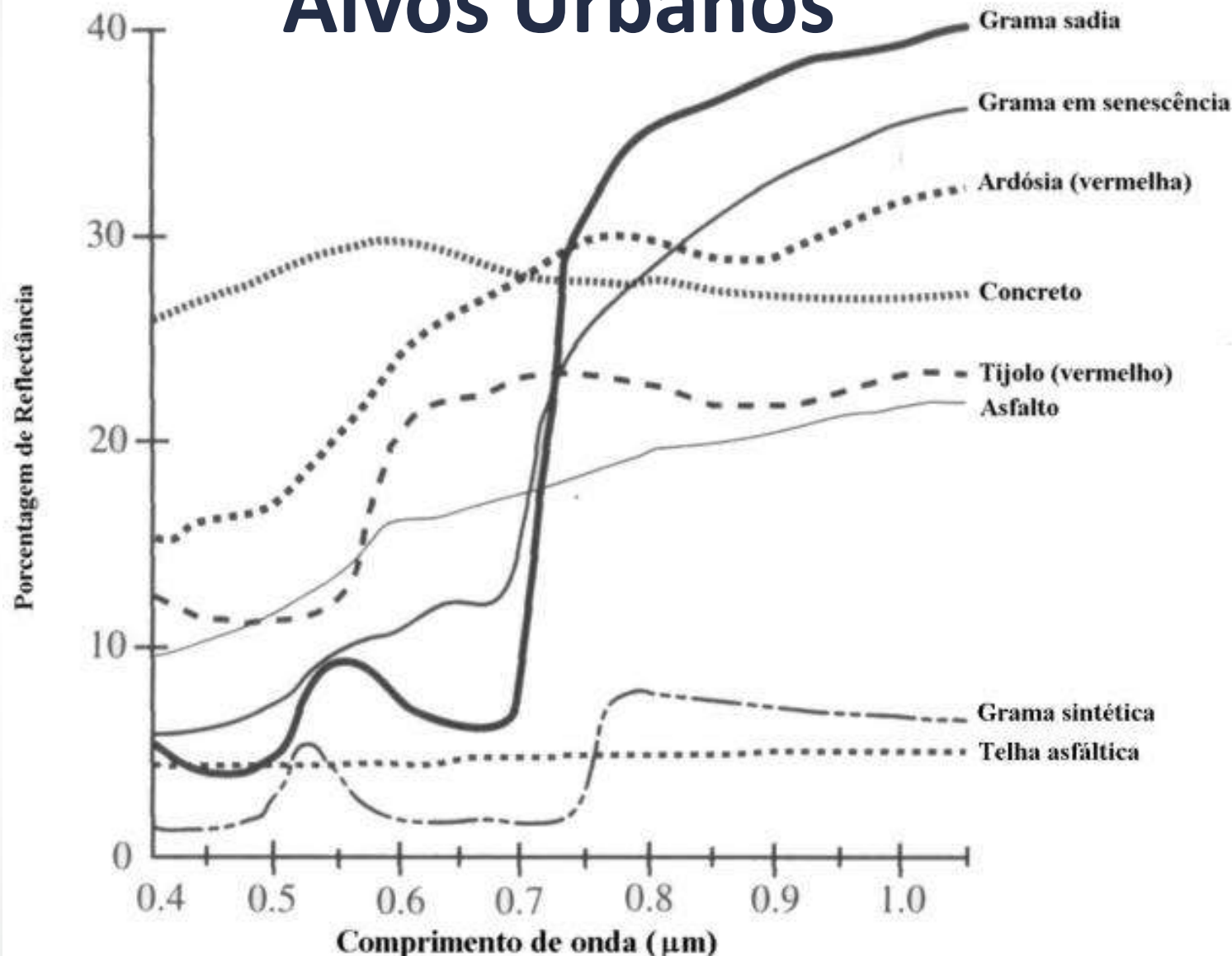
Reflectância Espectral da Água Líquida

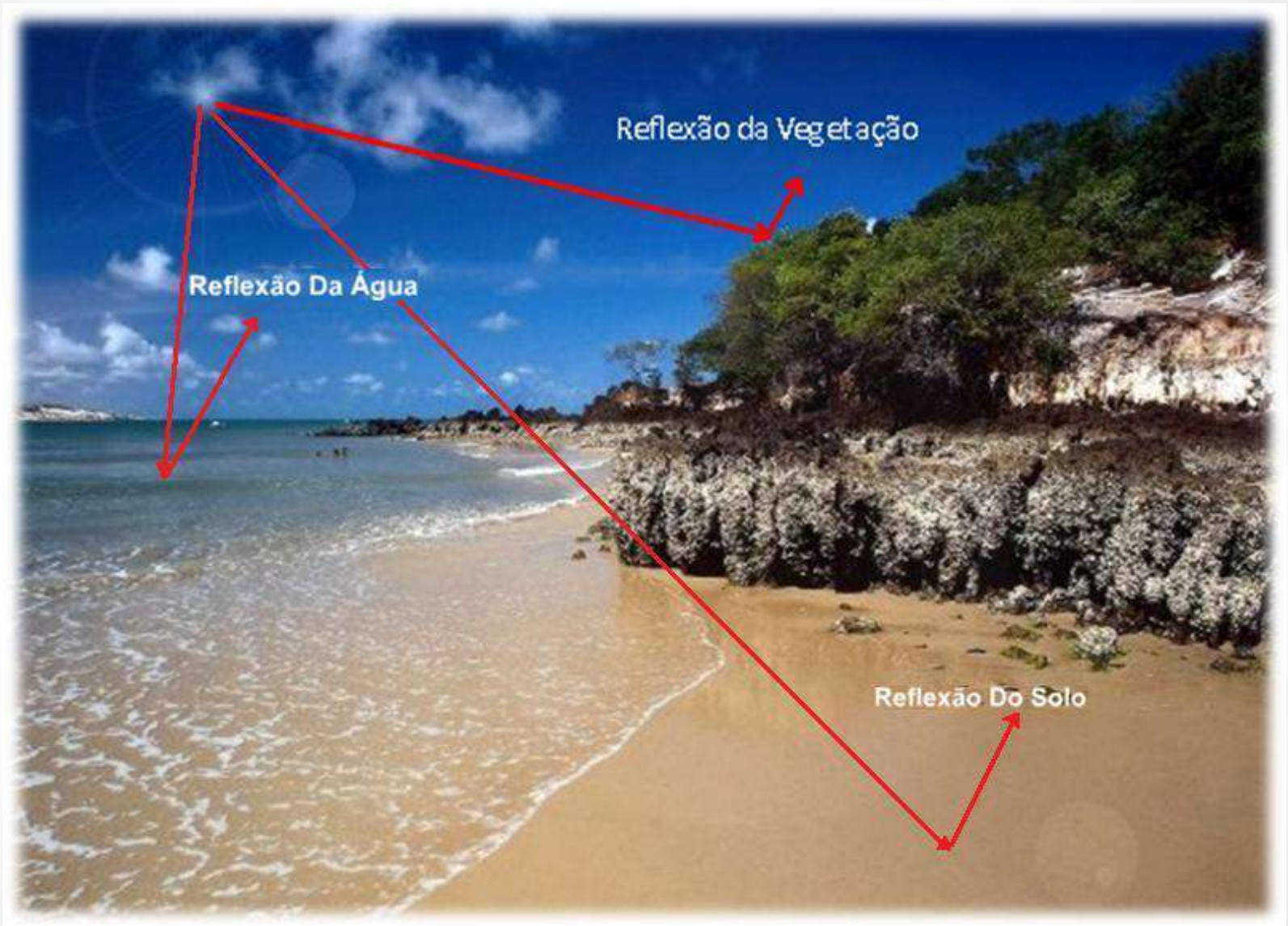
Reflectância de Água Clara e de Água com Algas



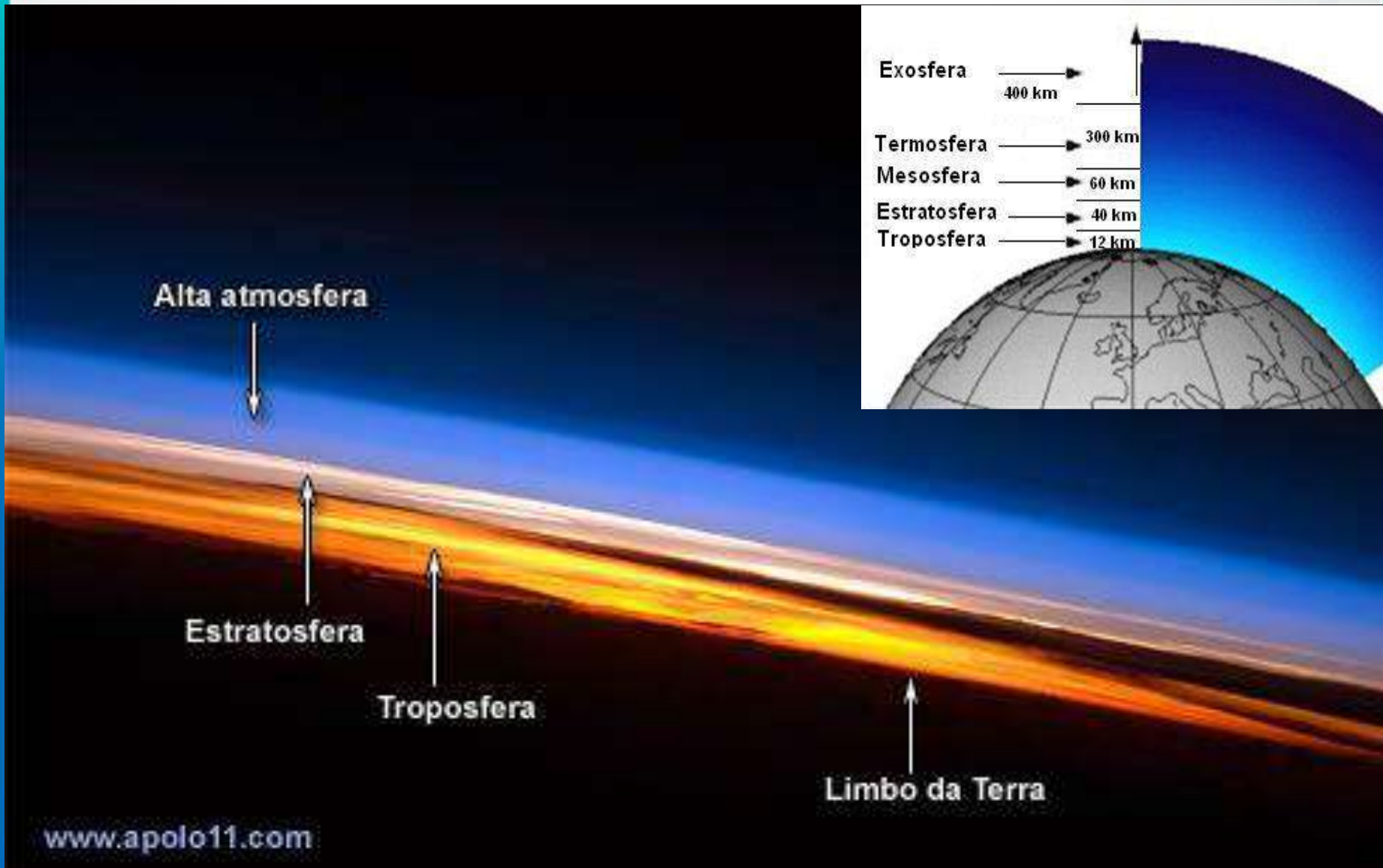
Medidas *in situ* de reflectância espectral da água clara e de água contendo clorofila. JENSEN, 2009.

Reflectância Espectral Alvos Urbanos



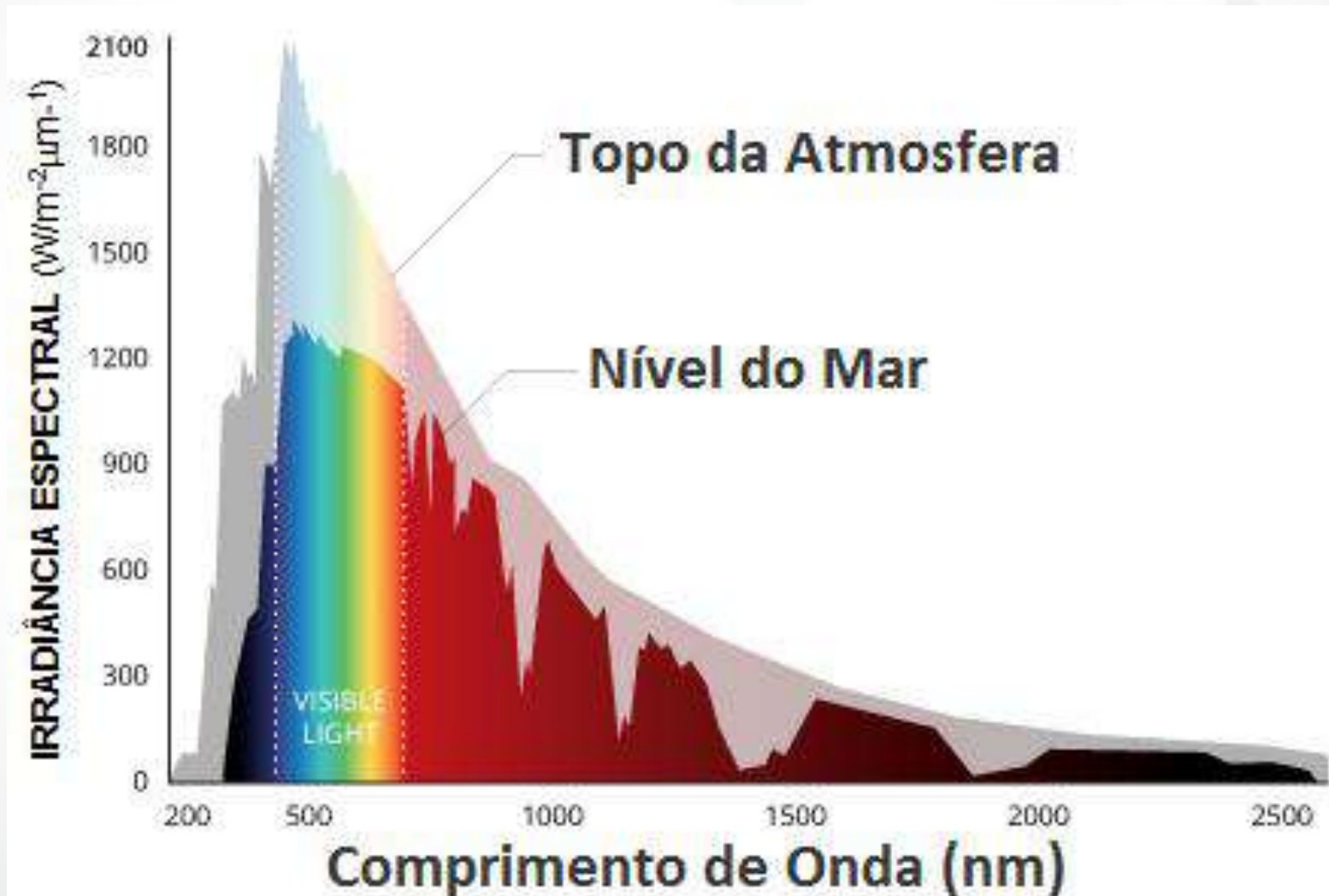


Interferência Atmosférica

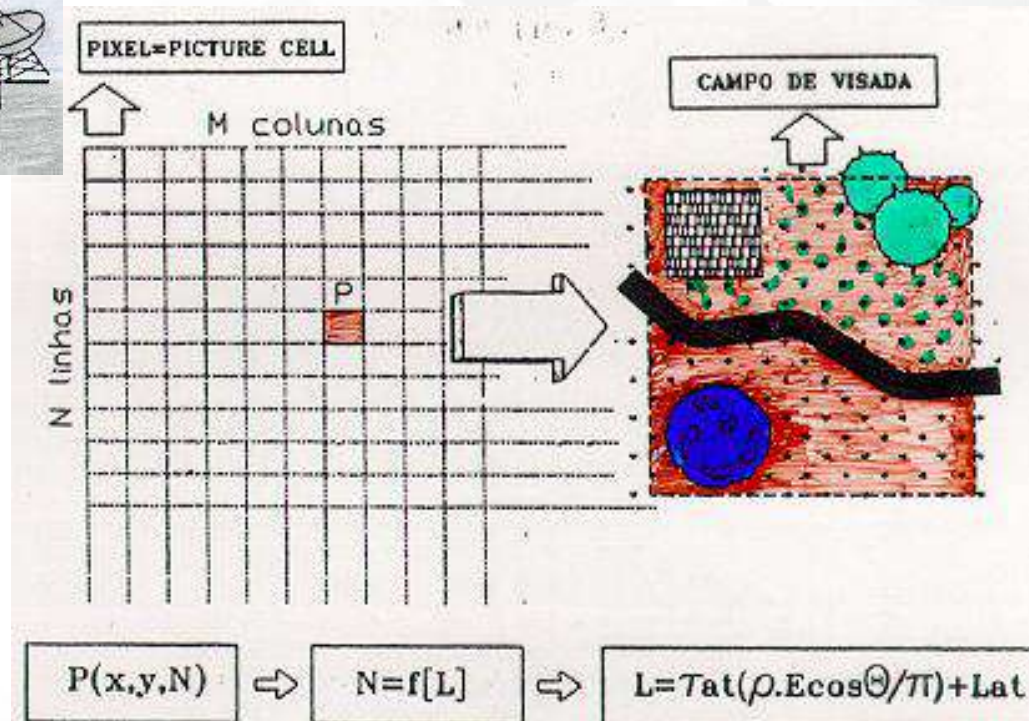
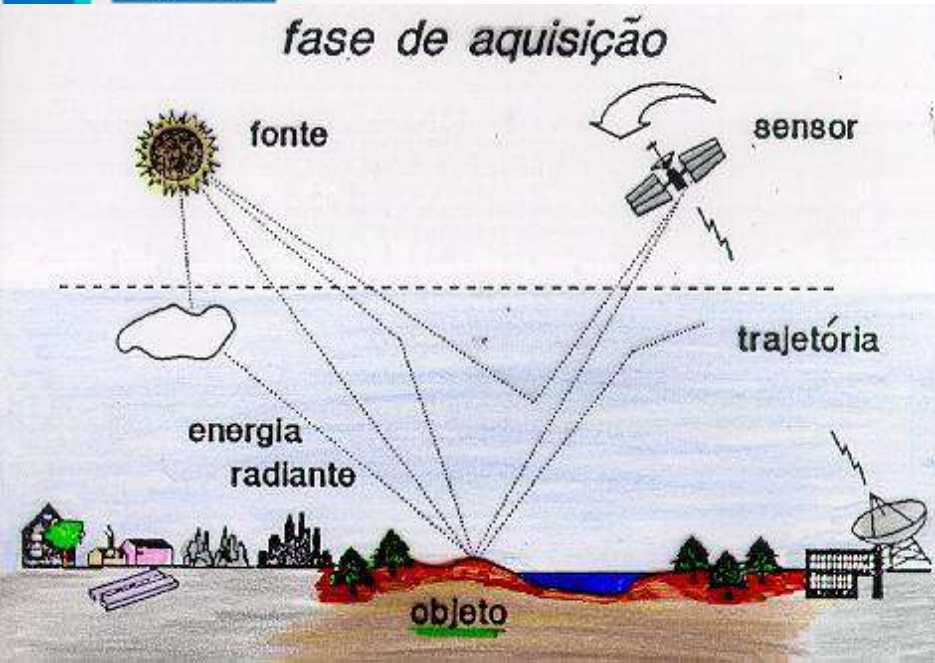


Atenuação Atmosférica

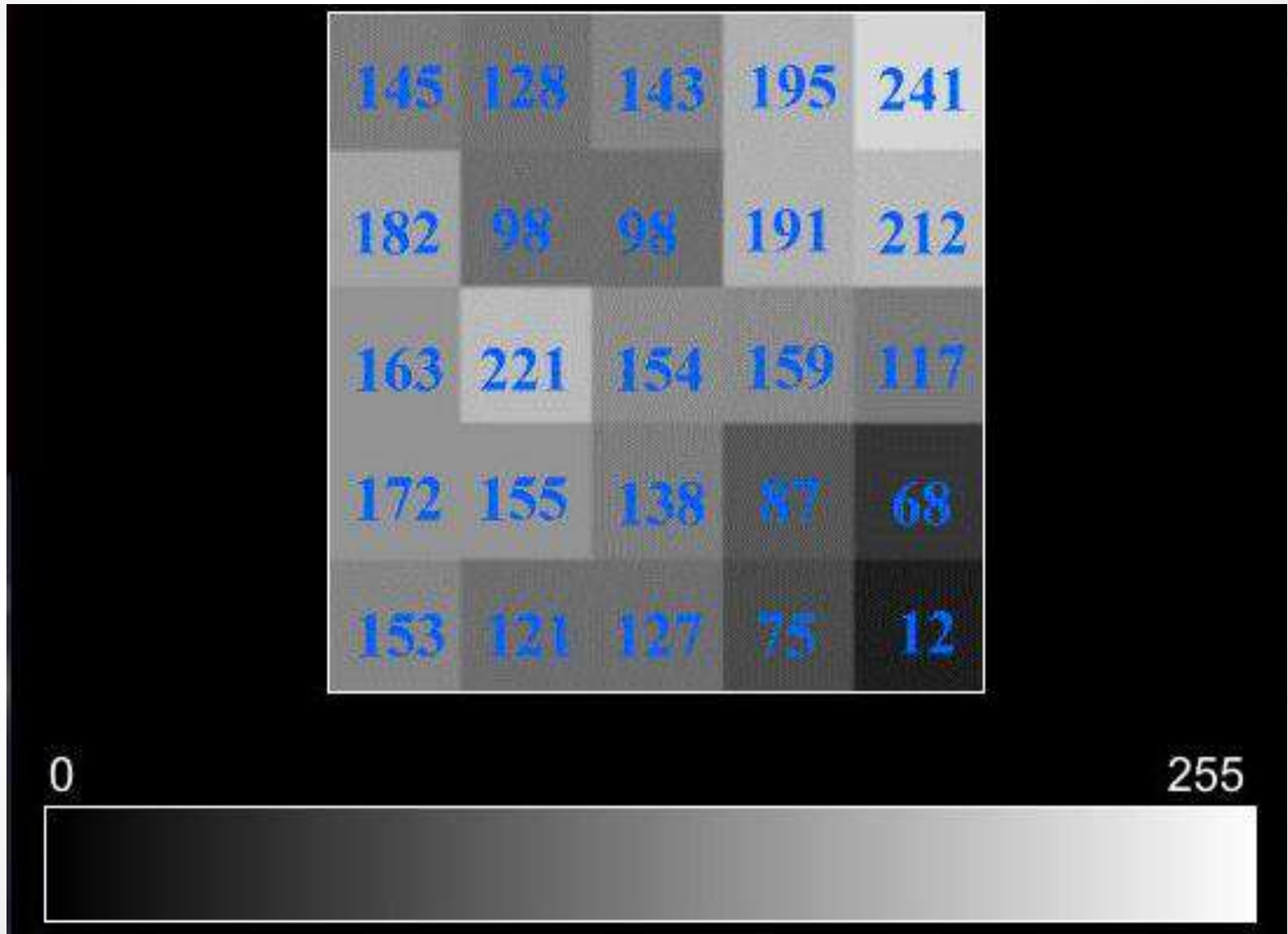
Gases atmosféricos são radiativamente seletivos



Aquisição das imagens



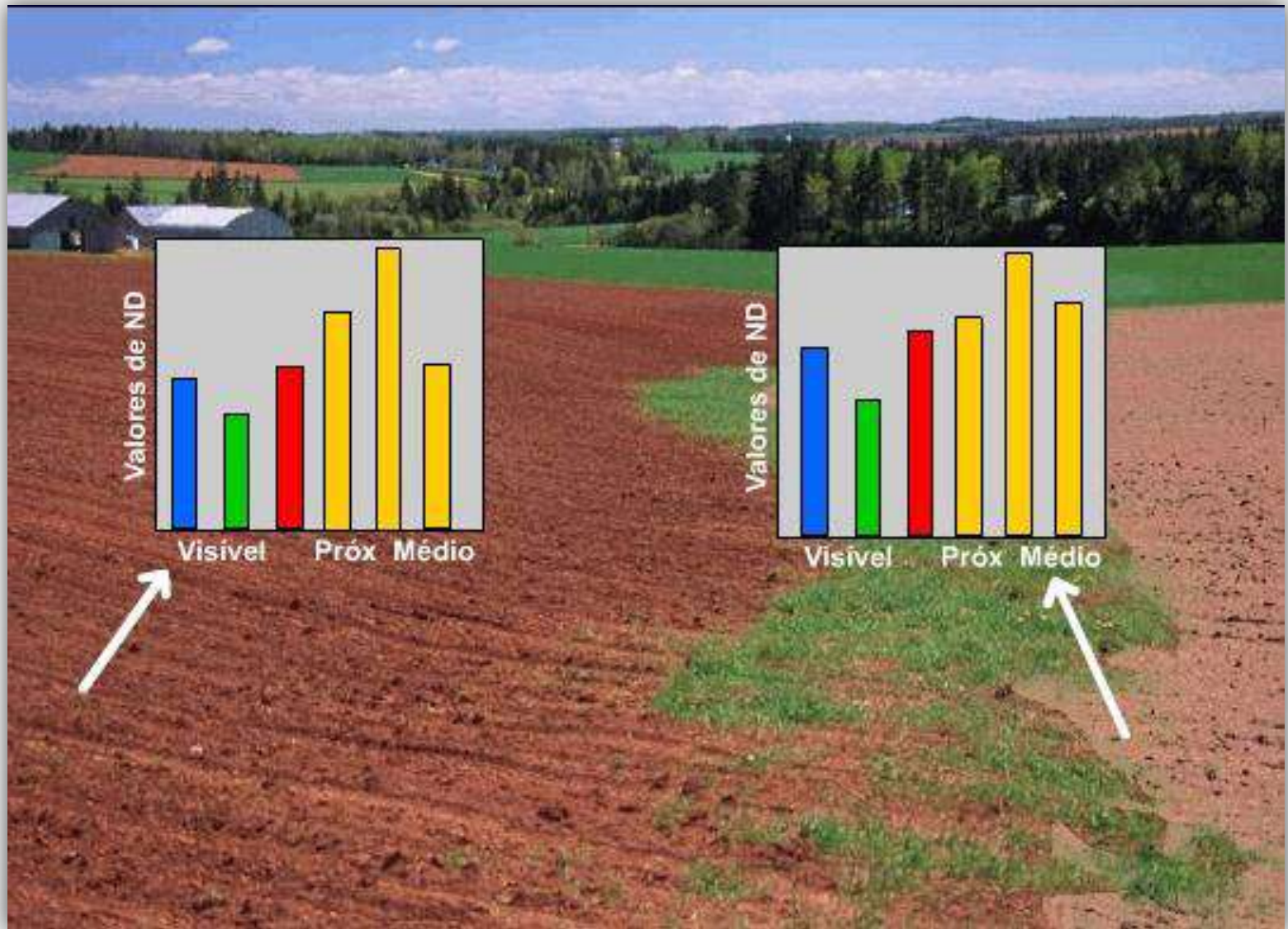
Nível de Cinza





Reflexão no Infravermelho Próximo





BANDA 1



BANDA 2



RIO DE JANEIRO

BANDA 3



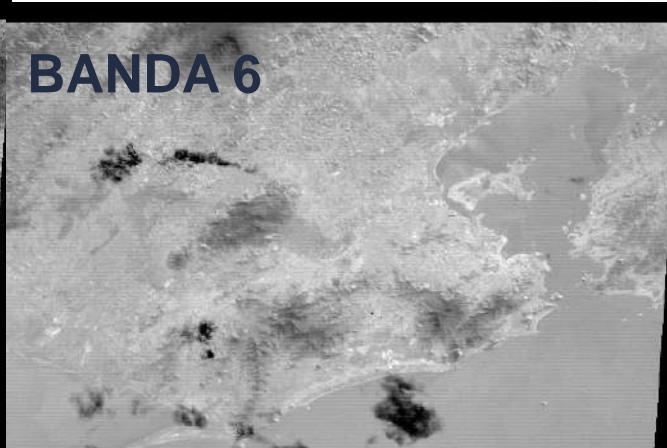
BANDA 4



BANDA 5



BANDA 6



BANDA 7



Composição colorida

A tela do monitor é composta de milhares de pequenas células coloridas (azul, verde e vermelho) dispostas em trincas. Quando o computador superpõe as imagens das três bandas no monitor, as células de cada cor, brilham com intensidades proporcionais aos níveis digitais de cada *pixel* da imagem monocromática correspondente e o resultado percebido é uma imagem colorida.

Ampliação da
Tela do Monitor

