

Koncept “VODA”

## 4. RAZRED PRIRODA I DRUŠTVO

- **ATMOSFERA – GLOBE UČENICI POUČAVAJU MLADE UČENIKE**



## 5. RAZRED GEOGRAFIJA

- **ATMOSFERA – METEO KUĆICA**



## 5. RAZRED PRIRODA

- **ŽIVOTNI UVJETI – METEO KUĆICA I GRAFIKONI S PODACIMA**

## 5. RAZRED MATEMATIKA

- **RAZLOMCI – DNEVNA KOLIČINA KIŠE U ODNOSU NA MJESEČNU KOLIČINU TE NOVI SNIJEG U ODNOSU NA GODIŠNJU KOLIČINU SNIJEGA**

$$\frac{5 \text{ ml}}{47 \text{ ml}}$$

$$\frac{16 \text{ mm}}{157 \text{ mm}}$$

## 6. RAZRED PRIRODA

- **UTJECAJ ČOVJEKA NA OKOLIŠ – TRAGOVI AVIONA**



### TRAGOVI AVIONA



**KRATKOŽIVUĆI TRAGOVI** – ovo su tanki tragovi aviona koji se na nebu kratko zadržavaju.



**DUGOŽIVUĆI TRAGOVI KOJI SE NE ŠIRE** – ovo su tanki tragovi aviona koji se na nebu dugo zadržavaju, ali se ne šire.



**DUGOŽIVUĆI TRAGOVI KOJI SE ŠIRE** – ovo su tanki tragovi aviona koji se na nebu dugo zadržavaju, ali se šire te zauzimaju sve veći dio neba.



## 6. RAZRED PRIRODA

- **VRSTE VODA NA KOPNU – TEKUĆICE I STAJAČICE**  
**(FIZIKALNA SVOJSTVA – TEMPERATURA, PROZIRNOST,**  
**MIRIS, BOJA)**




# 6. RAZRED PRIRODA


## • VRSTE VODA NA KOPNU – VRSTE OBLAKA

**NISKI OBLACI**

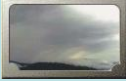
6. **STRATUSI** – ovo su sivi oblaci čija je baza vrlo nisko na nebu. Oni stvaraju oborine.




7. **STRATOKUMULUSI** – ovo su sivi oblaci s bjeličastim dijelovima čije je dno zakrivljeno, a često izrastu iz starih stratosa ili kumulosa koji se šire.




8. **NIMBOSTRATUSI** – ovo su tamni i sivo obojeni oblaci koji ne propuštaju sunčevu svjetlost, ali daju obilnu i trajnu oborinu.



9. **KUMULUSI** – su oblaci ravne podloge koji sličie velikoj cvjetnici. Ako ove oblake osvjetli sunce postaju svjetlacavo bijeli. Njihova podloga može biti djelomično siva, a oni ne daju oborine.




10. **KUMULONIMBUSI** – ovo su veliki, gusti i teški oblaci sa ravnom, tamnom podlogom koji izgledaju kao goleme planine. Ovi oblaci daju grmljavinu, iznenađni pljusak i nevrijeme.




**VISOKI OBLACI**


1. **CIRUSI** – ovo su prozirni bijeli oblaci građeni od malih ledenih kristalica, pojavljuju se tijekom toploga vremena te ne daju oborine



2. **CIROKUMULUSI** – ovo su bijeli tanki oblaci naborani u linije i redove te imaju izgled ovčje vune. Ne daju oborine, a prekrivaju veći dio neba.




3. **CIROSTRATUSI** – ovo su bijeli vrlo tanki oblaci koji često imaju boju kao i vedro nebo. Ne daju oborine, a prekrivaju čitavo nebo ili veći dio neba.




**SREDNJE VISOKI OBLACI**

4. **ALTOSTRATUSI** – ovo su plavičasti ili sivkasti oblaci koji prekrivaju čitavo nebo ili veći dio neba, često se kroz njih može vidjeti sunce, ali se oko Sunca ne stvara prividni krug. Ne daju oborine.



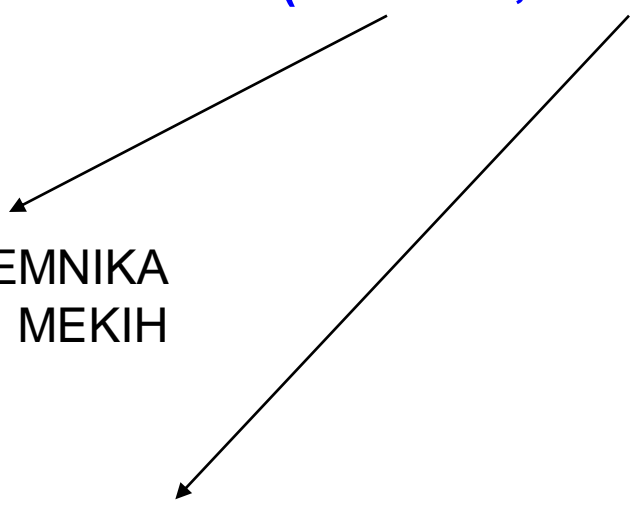
5. **ALTOKUMULUSI** – ovo su bijeličasti ili sivkasti naborani oblaci koji izgledaju poput morskih valova. Na njima se vide i sjenoviti (tamniji) dijelovi, a građeni su od vode i prekreat ledenih kristala. Ne daju oborine.





## 7. RAZRED KEMIJA I FIZIKA

- **VODA – AGREGATNA STANJA (KIŠNICA, OBLACI, SNIJEG)**



UZORAK KIŠNICE IZ SPREMNIKA  
ZA USPOREDBU TVRDIH I MEKIH  
VODA

VRSTE OBLAKA – ISTI  
OBRAZAC KAO I ZA  
PRIRODU 6. RAZRED

## 7. RAZRED KEMIJA

- **VODA – KEMIJSKA ANALIZA VODE NA HIDROLOŠKOJ POSTAJI**



## 7. RAZRED KEMIJA

- **VODA – GLOBE PROJEKTI IZ 2007. KVALITETA VODE NA IZVORIŠTIMA OPĆINE SOKOLOVAC TE 2008. KVALITETA VODE KOPRIVNIČKE RIJEKE**



# 7. RAZRED KEMIJA

- OTOPINE – RADIOAKTIVNI IZOTOPU U KIŠNICI (PROJEKT SA MEDICINSKIM FAKULTETOM RIJEKA)**



Water & Environment News  
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## Involving GLOBE Schools in a Study of the Stable Isotope Composition of Precipitation in Croatia

Students in Croatia contribute to gathering and analyzing precipitation information, used to support the IAEA's ongoing GNP programme.

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**K**arst is characterized by high permeability, porosity and crevices in which water moves through complex subterranean networks. Therefore, water resources in karst areas are very sensitive to pollution. This is of particular significance for Croatia, since about 50% of the country is karst, and the country's water management is a national priority. It is thus of vital interest to have as complete as possible knowledge of all factors which have input into the water system, including precipitation. Besides meteorological data, isotopic tracers are important tools to understand and quantify this complex problem. The isotopic composition of precipitation is determined primarily by the passage of water into and through the atmosphere; the imprint on water bodies through precipitation forms the basis of many hydrological studies. It is usually expressed by abundance ratios  $R$  for  $^2\text{H}/^1\text{H}$  and  $^{18}\text{O}/^{16}\text{O}$ , respectively, in terms of the so-called  $\delta$ -value,  $\delta(\%) = R_{\text{sample}}/R_{\text{standard}} - 1$ , with  $R_{\text{standard}}$  as the abundance ratio of an internationally accepted standard (e.g., the Vienna Standard Mean Ocean Water, VSMOW). Only sparse and scattered information exists, however, about the isotopic composition of precipitation in Croatia.

The GLOBE program appears particularly suited to remedy this problem. GLOBE (Global Learning and Observations to Benefit the Environment) is a worldwide primary and secondary school-based science and education program. In Croatia, about 100 schools are involved in GLOBE, and at present 24 contribute to a nationwide collection of precipitation (Figure 1). This activity is supported by the IAEA Research Project.

Students interested in the GLOBE program collect and determine amounts of daily precipitation, measure air temperature and send monthly averaged water samples to the Stable Isotope Laboratory (SILab) at Rijeka University. At the SILab, samples are analysed for their conductivity, pH, dissolved oxygen, salinity and isotopic composition in a Thermo-Fisher DeltaPlusXP mass spectrometer using a combination of dual inlet and equilibration unit as periphery. The samples are equilibrated with  $\text{H}_2$  and  $\text{CO}_2$ , where their isotopic composition is transferred to these gases and then analysed in the mass spectrometer. The required working standards were produced by collecting waters of different  $\delta$ -values and storing them under nitrogen gas in stainless steel bottles. Their  $\delta$ -values were calibrated through comparison with IAEA standards. Since the first results of this project already demonstrate the complexity of the meteorological situation in the country, it is appropriate to briefly look at the location of the country, and corresponding implications.

### Climate and Geomorphology of Croatia

Croatia is located in Southeast Europe, bordering on the Adriatic Sea. The climate is moderate, while in most inland areas it exhibits a more continental character. From autumn until spring, frequent cyclones can cause weather instability over the northern Adriatic, and heavy precipitation, accompanied by secondary cyclogenesis with strong westerly winds along the coast and Siberian anticyclones result in quite stable conditions, often with strong, dry northerly winds - "bura" at the seaside. Regional and local orographic diversity have an important



Figure 1. The participating GLOBE schools in Croatia.

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## 8. RAZRED INFORMATIKA

- **UNOS PODATAKA I OBRADA GLOBE BAZE**

