

April 15, 2024

News and notes

Before going on to discuss the geology and geopolitics of [Croatia](#), here are some news items I thought were interesting.

Bad Science

- [Exclusive: official investigation reveals how superconductivity physicist faked blockbuster results](#); Video from Sabine Hossenfelder [here](#).

Research and Geology News

- Mineralogy: [Correlation between induced polarization and sulfide content of rock samples obtained from seafloor hydrothermal mounds in the Okinawa Trough, Japan](#).
- Zircons, one of my favourites: [Tiny crystals capture millions of years of mountain range history – a geologist excavates the Himalayas with a microscope](#).
- More zircons: [Minimizing the effects of Pb loss in detrital and igneous U–Pb zircon geochronology by CA-LA-ICP-MS](#).
- Geology Bites Podcast: [Richard Ernst on Large Igneous Provinces](#); this one is really good.
- Fluorite, var. Blue John: [One Of The Rarest Minerals On Earth Runs Through This Derbyshire Hillside](#).
- Oceanography and computer modelling: [A Verification Suite of Test Cases for the Barotropic Solver of Ocean Models](#); Phys.org summary [here](#).

Plate Tectonics

- Plate tectonics and geochemistry: [The relationship between iron redox states and H₂O contents in back-arc basin basaltic glasses from the North Fiji Basin](#).
- More geochemistry and plate tectonics: [Deciphering Contribution of Recycled Altered Oceanic Crust to Arc Magmas Using Ba-Sr-Nd Isotopes](#); Phys.org summary [here](#).

Paleontology

- Ancient cats: [Cauca: megafaunal and felid fossils \(Mammalia\) from a Pleistocene site in northwest Venezuela](#).
- Ancient vertebrates: [The Life and Death of *Jamoytius kerwoodi* White; A Silurian Jawless Nektonic Herbivore?](#)
- [Evolution of the temporal skull openings in land vertebrates: A hypothetical framework on the basis of biomechanics](#); Phys.org summary [here](#).
- Mass extinctions: [Tectonic trigger to the first major extinction of the Phanerozoic: The early Cambrian Sinsk event](#); Live Science summary [here](#).

Mining and Energy

- Honey, could you pickup some hamburger and gold at Costco this afternoon? [What Costco's Gold Bar Bonanza Tells Us About the Economy.](#)
- Ore deposit geology: [Epithermal Gold Discoveries in the Emerging Khundii Metallogenic Province, Southwest Mongolia.](#)
- Geopolitics of Iron: [China's big move to cut off Australian iron ore.](#)
- Regulatory disagreement: [Alaska sues EPA over Pebble mine prohibitions.](#)
- [First Nation in Yukon celebrates 'landmark' court win against proposed mining exploration.](#)
- [Vale walks away from exploration JV with Serabi Gold.](#)
- [BHP set to dethrone Codelco as world's biggest copper producer.](#)
- [Copper outlook: The amount of copper needed in the next 30 years - take all the copper ever mined and double it, says Green Rush host Matt Watson.](#)
- Exploration: [Fresh drilling set after promising find near old Craigmont Mine site northwest of Merritt.](#)
- Papua New Guinea: [PNG government to send military and police in crack down on illegal mining and 'squatters' at Porgera gold mine.](#)
- [BMO drops anti-coal policy amid Wall Street rebuke of ESG.](#)
- Increased local demand, reduced exports: [Mexico Set to Slash Oil Exports by Over 300,000 Bpd in May](#), historical note: Petróleos Mexicanos (PEMEX) [was set up](#) to ensure domestic oil supply; related story: [U.S. imports of Mexican crude oil fall to lowest on record, EIA says.](#)
- [U.S. Crude Production To Decline In 2024 As Shale Activity Stalls.](#)
- [Biggest North Sea oil find in decades to be drilled for first time.](#)
- Battery technology: [Manipulating the diffusion energy barrier at the lithium metal electrolyte interface for dendrite-free long-life batteries.](#)
- [How new tech is making geothermal energy a more versatile power source.](#)

Environmental Geology and Hydrogeology

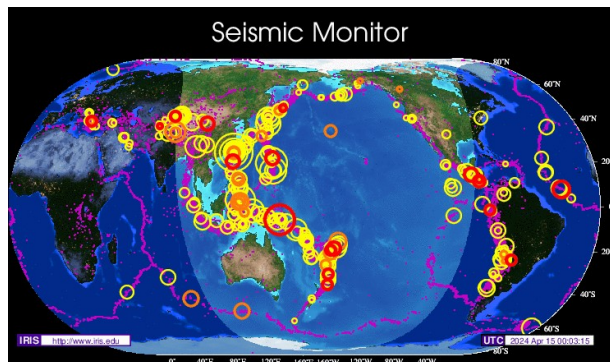
- [UNESCO names 18 new Geoparks](#), BBC summary [here](#).
- From the Wall Street Journal: [China Details Vast Extent of Soil Pollution](#); sorry behind a paywall.
- Environmental effects of mining and smelting: [Cheap coal, cheap workers, Chinese money: Indonesia's nickel success comes at a price.](#)

- Airborne toxin regulations: [Biden-Harris Administration Finalizes Stronger Clean Air Standards for Chemical Plants, Lowering Cancer Risk and Advancing Environmental Justice](#).
- Dump a gigatonne of [olivine](#) in the ocean to lower CO₂, what could go wrong? [Global-Scale Evaluation of Coastal Ocean Alkalinity Enhancement in a Fully Coupled Earth System Model](#).
- PFAS: [Exposure of Peregrine Falcons to Halogenated Flame Retardants: A 30 Year Retrospective Biomonitoring Study across North America](#); behind a paywall, Phys.org summary [here](#).
- Whiskey's for drinking and water's for fighting: [Contemporary and relic waters strongly decoupled in arid alpine environments](#); Mining.com summary [here](#).
- [B.C. doesn't know where all its groundwater is going. Experts worry as drought looms](#).
- [Sask. greenlights deal with Alberta, Manitoba to manage underground water reserves on Prairies](#).
- Hare-brained scheme: [Glencore wants to inject CO2 into the Great Artesian Basin | ABC News](#); more information of the Great Artesian Basin [here](#).

Glaciers and Climate Change

- [Subsurface Warming of the West Antarctic Continental Shelf Linked to El Niño-Southern Oscillation](#); Phys.org summary [here](#).
- [Amundsen Sea circulation controls bottom upwelling and Antarctic Pine Island and Thwaites ice shelf melting](#).
- [Shaking up Assumptions: Earthquakes Have Rarely Triggered Andean Glacier Lake Outburst Floods](#); Phys.org summary [here](#).

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

- United States Geological Survey (USGS) Volcano Watch: [HVO and Collaborators Continue Seismic Surveys Across the Active Volcanoes of Hawaii](#).

- USGS Yellowstone Volcano Observatory: [A beginner's guide to dating \(rocks\)](#).
- [Smithsonian / USGS Weekly Volcanic Activity Report](#).
- Mt. Etna: [Watch One Of The World's Most Active Volcanoes Produce Vortex Rings](#).
- Iceland: [This eruption already more extensive than previous six eruptions](#); [The magma chamber is not as deep as previously thought](#);
- Historical volcano: [Toba supervolcano, the biggest eruption in human history](#).
- [Euro-Mediterranean Seismological Centre](#).
- [Earthquakes Monitoring Live Worldwide](#).
- From Kyle Bradley and Judith A Hubbard: [The great tidal earthquake hypothesis test part IV: Can tides warn us of upcoming large earthquakes?](#) Part 1 [here](#), part 2 [here](#) and part 3 [here](#).
- [Seismic attenuation and stress on the San Andreas Fault at Parkfield: are we critical yet?](#) Live Science summary [here](#).
- [Small earthquake shakes Southern California desert near site of Coachella music festival](#); USGS summary [here](#).
- Man made earthquakes: [Texas earthquake could further restrict oil companies' saltwater disposal options](#).
- Flood prevention: [The value of marsh restoration for flood risk reduction in an urban estuary](#); Phys.org summary [here](#).

Upcoming Events

- If you are in Calgary, AB for the Stampede: [Bootleggin' Breakfast 2024](#), July 9 & 11, 2024.



[May 19-22, 2024](#)



[Goldschmidt is the foremost annual, international conference on geochemistry and related subjects, organized by the Geochemical Society and the European Association of Geochemistry](#)

April 15, 2024

Geology and the Fate of Societies – Croatia



Figure 1 – Croatia

Credit: [CIA World Factbook, Croatia](#), public domain

This week we'll take a look at the Republic of [Croatia](#) (*Republika Hrvatska*), one of the successor states to the former [Socialist Federal Republic of Yugoslavia](#) on the [Balkan Peninsula](#) of [Europe](#). To the west of Croatia is the [Adriatic Sea](#), to the north is [Slovenia](#); to the northeast is [Hungary](#); to the east is [Serbia](#); and to the southeast is [Bosnia & Herzegovina](#) (which we looked at in [October 2023](#)); and to south is [Montenegro](#).

According to the [Central Intelligence Agency](#) (CIA) [World Factbook on Croatia](#), the country has a total area of 56,594 square kilometres (km²) of which 55,974 km² are land and 620 km² are water. Also according to the CIA, 4,169,239 people live in Croatia. Of that approximately 4.17 million people, 91.6% are ethnic [Croats](#), 3.2% are [Serbs](#), and 5.2% are other/unspecified (includes [Bosniaks](#), [Romani](#), [Albanians](#), and [Italians](#)). 95.2% of the people in Croatia speak [Croatian](#) (a variant of [Serbo-Croatian](#)). Other languages spoken include [Serbian](#) and [Bosnian](#) (also variants of [Serbo-Croatian](#)), [Romani](#), [Albanian](#), and [Italian](#).

The main cultural difference between Croats, Serbs and Bosnians is religion. Croats tend to be [Roman Catholic](#), Serbs tend to be [Eastern Orthodox](#) and Bosniaks tend to be [Muslim](#). In Croatia, 79% are Roman Catholic, 3.3% are Orthodox, 5.1% are [Protestant](#) or other Christian, 1.3% are Muslim 1.3%, and the remainder are either [agnostic](#), [atheist](#), other, or unspecified.

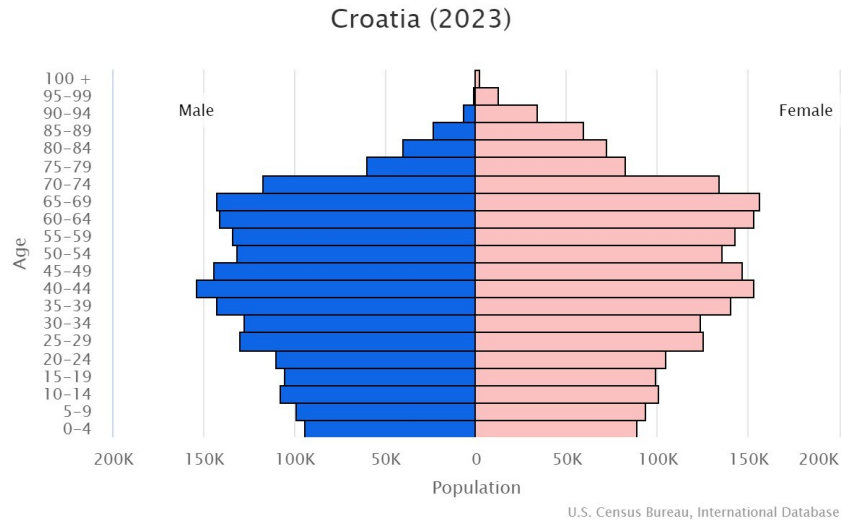


Figure 2 – Demographic Profile, Croatia
 Credit: U.S. Census Bureau International Database – Croatia, public domain

The [demographic profile of Croatia](#) shows a middle-aged country, with a declining birthrate [typical of an urbanized and industrialized society](#). The median age for both men and women is 44.8 years, the average life expectancy is 77.5 years for both sexes, and the total fertility rate is 1.46 births per woman. The fertility rate is less than replacement, 2.1, and the consequence is that the population is declining at 0.5% per year.

Croatia is a [unitary parliamentary republic](#). The President is [Zoran Milanović](#), the Prime Minister is [Andrej Plenković](#) and the legislature is called the [Sabor](#). The Capital and largest city in Croatia is [Zagreb](#) (pop. 1,217,150 in the metropolitan area).

Geology

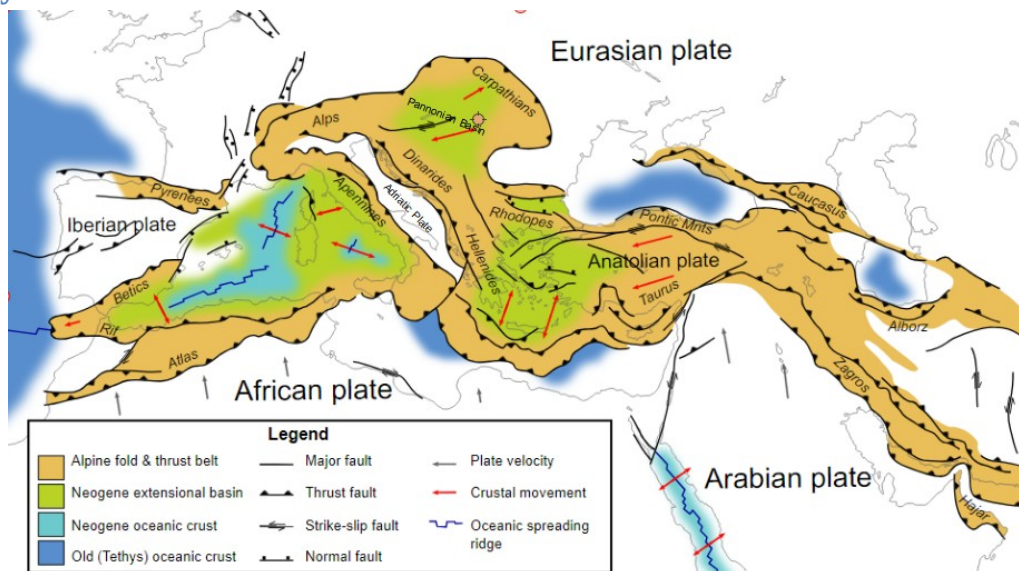


Figure 3 – Tectonic Framework of the Mediterranean Basin
 Credit, mod.: [Woudloper](#), Creative Commons Attribution-Share Alike 1.0 Generic license

The [geology of Croatia](#) has its origins in the ancient [Tethys Ocean](#) and the closing of that ocean during the [Alpine Orogeny](#). Croatia has three main geological provinces:

- The [Dinarides](#) mountain range, in the centre of the country;
- The [Pannonian Basin](#), to the northeast; and
- The [Adriatic Plate](#), mostly under the Adriatic Sea.

The Dinarides or Dinaric Alps is a [fold and thrust belt](#) where the Adriatic Plate has been forced under the [Eurasian Plate](#) by the Alpine Orogeny. The Dinarides are largely made up of [Mesozoic](#) deposits, mostly [carbonate rocks](#). The Dinarides are also where geologists coined the term [karst topography](#) for the erosional features found among the [carbonate deposits of Croatia](#).

The Pannonian Basin is an [extensional basin](#) between the Dinarides and the [Carpathian Mountains](#) and also generally coincides with the basin of the [Danube River](#). Croatia only occupies a portion of the Pannonian Basin. The rest of the Pannonian Basin is occupied by Hungary, which lies entirely within the basin as well as parts of southern [Slovakia](#), southeast [Poland](#), western-southwest [Ukraine](#), western [Romania](#), northern Serbia, northeast Slovenia, and eastern [Austria](#). The deposits in the Croatian part of the Pannonian Basin are mostly [clastic](#) deposits ranging in age from [Cretaceous](#) to [Paleogene](#) to [Neogene](#) and to [Quaternary](#).

The Adriatic Plate is a small [tectonic plate](#) made up mostly of [continental crust](#). Sometimes called the Apulian Plate, it split off from the [African Plate](#) along a large [transform fault](#) during the Cretaceous.

Figure 4 shows the general geology of Croatia. For further information on Croatian geology, check out the [Croatian Geological Survey](#) and their journal [Geologia Croatica](#).

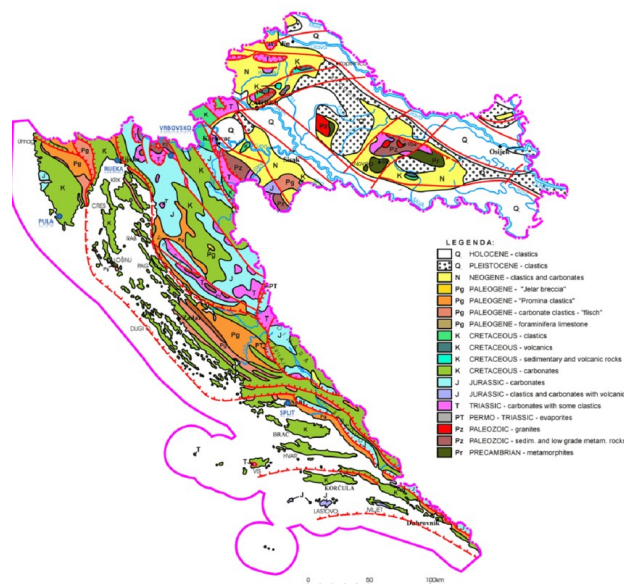


Figure 4 – Geology of Croatia
Credit: Figure 8 in [Jug & Grabar, 2020](#)

Resources

Agriculture



Figure 5 – Farm Fields in Croatia

Credit: [MayaSimFan](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#) license

According to the CIA World Factbook on Croatia, 23.7% of the land in the country is used for agriculture (16% [arable land](#), 1.5% [permanent crops](#), 6.2% [permanent pasture](#)), 34.4% is forest and 41.9% is other. The major agricultural crops are grains ([maize](#), [wheat](#), [barley](#)), [sugar beet](#), [soybeans](#), [potatoes](#), [grapes](#), and [sunflower seed](#). Major livestock products are [dairy products](#) and [pork](#).



Fruit production in Croatia is important, not least for the [production of plums](#) and their favourite intoxicant [slivovitz](#). It's powerful stuff and alcoholism is a [serious issue in Croatia](#). So just be careful if you care to try it.

Despite the good potential of their farmland, [Croatia imports more than half of its fruit and vegetables from other countries in the European Union](#).

Figure 5 – Five Different Bottles of Slivovitz

Credit: [Chris Capoccia](#), released to [public domain](#)



Figure 7 – State Stud Farm, Đakovo, Croatia

Credit: [Tromber](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

Another important kind of livestock raised in Croatia are the famous [Lipizzaner](#) horses. Many of these horses are raised at the [State Stud Farm in Đakovo](#).

Croatia is a fairly wealthy state so [food insecurity](#) is currently a minor issue, affecting about 9.7% of the population (2020-2022). Statistics on food production from the United Nations Food and Agriculture Organization can be found [here](#).

Forestry



Figure 8 – Aleppo Pine, [Pinus halepensis](#), Forest Near Dubrovnik, Croatia
Credit: [Stiller Beobachter](#), [Creative Commons Attribution 2.0 Generic](#) license.

[Forests in Croatia](#) cover 34.4% of the land. Most, 80%, of forest is state owned and privately held forest makes up the remaining 20%. Forests in Croatia are harvested for various purposes, the current allowed annual harvest quantity is 8,037,172 m³. Common species of trees in Croatian forests include [beech](#), [oak](#), and [fir](#). With regards to deforestation, [from 2001 to 2023, Croatia lost 106 kha of tree cover, equivalent to a 4.4% decrease in tree cover since 2000.](#)

Mineral Resources



Figure 9 – Salt Pans at Ston, Croatia

Credit: [Jules Verne Times Two](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

The mineral resources currently exploited in Croatia include: [gypsum/anhydrite](#), [lime](#), [salt](#), [aggregate](#) (stone, sand, and gravel), [dimension stone](#), [natural gas](#) and [petroleum](#); mines and sources include:

- Gypsum and anhydrite are produced at the Brescici Mine near Kulen-Vakuf;
- Salt is produced on [Pag Island](#) and at [Ston](#);
- Natural gas is produced from [offshore gas fields](#) in the Adriatic Sea: [Irena and Izabela field](#) and [Ika JZ](#), as well as onshore natural gas fields at [Molve](#), [Vuckovec](#), and [Zebanec](#).
- Petroleum is produced from oilfields in the [Sava Depression](#) in the Pannonian Basin together with other locations.
- [Sulphur](#) and [ammonium nitrate](#) production is associated with petroleum and natural gas production in Croatia.
- Associated with the production of aggregate and lime is [cement production](#).

Summary and statistics on the mineral industry in Croatia from the USGS are found [here](#). For a discussion of now closed mines in Croatia, check [this site](#).

Climate

Köppen climate types of Croatia



Köppen climate type

Csa (Hot-summer mediterranean)	Dfb (Warm-summer humid continental)
Cfa (Humid subtropical)	Dfc (Subarctic)
Cfb (Oceanic)	

*Isotherm used to separate temperate (C) and continental (D) climates is -3°C
Data source: Climate types calculated from data from WorldClim.org

Climate in Croatia varies with elevation and distance from the Adriatic Sea. Along the Adriatic coast are areas of [Hot-summer Mediterranean climate \(Csa\)](#) and [Humid subtropical climate \(Cfa\)](#). Inland, and at higher elevations are areas of [Warm-summer humid continental climate \(Dfb\)](#) and in the highest elevations, [Subarctic \(Dfc\) climate](#) prevails. Also, inland from the Adriatic sea, you find [Oceanic climate \(Cfb\)](#).

Figure 10 – Köppen Climate Types of Croatia
Credit: [Adam Peterson, Creative Commons Attribution-Share Alike 4.0 International](#) license

If you find the prospect of visiting Croatia intriguing, note that it is considerably safer to visit now than 30 years ago (see history below). Travel advisories for Croatia are [here](#) and [here](#). The Climate to Travel site on Croatia is [here](#); and the Lonely Planet site on Croatia is [here](#). Depending on where you visit in Croatia, some places should be avoided, as in Figure 11.



Figure 11 – Not the Kind of Mines You Should Visit
Credit: [Minestrone, Creative Commons Attribution-Share Alike 4.0 International, 3.0 Unported, 2.5 Generic, 2.0 Generic and 1.0 Generic](#) license

History and Geopolitics

A Bloody History



Figure 12 – The Kingdom of Croatia During the Reign of [King Peter Cresimir IV](#)
Credit: [Pečjak Rudolf \(1891-1940\)](#), [public domain](#)

The [history of Croatia](#) goes back a long ways and predates the arrival of [South Slavs](#), including the Croats, in the region during the [Migration Period of the Dark Ages](#). So let's look at it.

During the [Middle Pleistocene](#), Neanderthal humans lived in what is now Croatia, with the most famous site at [Krapina](#). Later, after the Neanderthals either [died out out or were exterminated](#), modern humans moved [into the Balkans](#) beginning 54,000 years ago during the [Late Pleistocene](#).

[Anatolian farmers](#) moved into modern Croatia during the [Holocene](#), beginning around 6,000 years ago. Various prehistoric [Neolithic](#), [Chalcolithic](#), and [Bronze Age](#) cultures occupied modern Croatia including the [Starčevo](#), [Vučedol](#) and [Baden cultures](#). Later, during the [Iron Age](#), people of the [Illyrian Hallstatt culture](#) and the [La Tène culture](#) lived here. The changes from one culture to another over time was sometimes the result of peaceful change, and sometimes the result of violent conquest. Archaeologists argue about it, but the [evidence is that people are often violent](#).

The Greek author [Hecataeus of Miletus](#) recorded that around 500 BC, the inhabitants of the Eastern Adriatic region was included tribes such [Histrians](#), [Liburnians](#), and [Illyrians](#). [Greek colonists](#) along the Adriatic and later the [Roman Republic](#) increasingly incorporated the East Adriatic tribes into their polities, sometimes peacefully and sometimes not. Under first the Roman Republic, and then the [Empire](#), the provinces of [Pannonia](#) and [Dalmatia](#) became prosperous, generally [Latin](#) speaking, parts of the Roman domain.

It was not last. [The end of the Western Roman Empire](#) involved a [whole host of troubles](#), primarily [civil war](#) and [disease](#). These troubles depopulated the Illyrian provinces of the Empire and tribes such as the [Avars](#) and [Croats](#) invaded the region during the 6th and 7th centuries AD. While there are numerous theories about the [origin of the Croatians](#), keep in mind that one of the dynamics in play during the Migration Period was the rise of war bands that [fought, conquered and otherwise caused a great deal of trouble](#) as they travelled through the chaos of the [Dark Ages](#). These wandering gangs of refugees were made up of a variety of desperate people from different broken polities. Eventually, many of [these war bands coalesced](#) into more stable political entities through a process of [ethnogenesis](#), inventing a new identity for themselves along the way. As I noted in the discussion on [Bosnia](#) last October, genetic studies of Croats, Serbs and Bosnians conclude that the [“culturally diverse Western Balkan populations are genetically very similar to each other”](#). However I would be careful drawing this to the attention of a Bosniak, Serb or Croatian.

The Croats organized themselves into first the [Duchy of Croatia](#) (800 to 925 AD) and then the [Kingdom of Croatia](#) that lasted from 925 to 1102. Later, the Kingdom of Croatia combined with the Kingdom of Hungary in a [personal union \(common king\)](#) that lasted from 1102 till 1527. Also during this time, the [Republic of Ragusa](#), [Republic of Poljica](#), and [the Republic of Venice](#) were all active along the Adriatic coast. The Croats endured plenty of internal troubles as well as the [Hundred Years' War between the Croats and the Ottoman Empire](#). The [Austrian Hapsburgs](#) were also at war with the Ottomans on a regular basis. In 1527, the Hapsburg Emperor, [Ferdinand I](#), assumed the title of King of Croatia. The Hapsburgs ruled Croatia until the end of the [Great War](#) in 1918. Croatia's troubles did not cease and there were periodic wars and revolutions under Hapsburg rule, [read the articles on Croatian history](#).

The ultimate [causes of World War 1](#) lay in the ambitions of Croatia's neighbours and, as part of the [Austro-Hungarian Empire](#), Croatia [had its part to play](#). The Austro-Hungarian Empire was broken up after the Great War and many nationalist schemes that floated around prior to the war were considered. One of these schemes was the [Illyrian Movement](#) of the 19th century, which proposed that all the South Slavs – mostly the Croats, Serbs, Slovenes and Bosniaks – should unite under a common state. Like many hare-brained political schemes, it appealed to some in the intellectual class, but completely ignored the cultural realities that separate these ethnic groups. They gave it a try anyway and in 1918 they formed [Kingdom of Serbs, Croats and Slovenes](#) a.k.a. [Yugoslavia](#) with [Peter I](#) as its [first sovereign](#).

Against the odds, Yugoslavia held together despite:

- A shootout in the Parliament where [Puniša Račić](#) of the Serbian [People's Radical Party](#), assassinated [Croatian Peasant Party](#) (HSS) representatives [Pavle Radić](#) and [Đuro Basariček](#) and mortally wounded HSS leader [Stjepan Radić](#);
- The [subsequent dictatorship](#) of [King Alexander](#) in 1929;
- An uprising led by the [Croatian Ustaše's in November 1932](#);
- [The assassination of King Alexander in 1934](#); and
- The [German invasion of Yugoslavia](#) during World War 2,

- The creation of rival anti-German partisan groups during the war such as the Royalist [Chetniks](#) and the Communist led [Yugoslav Partisans](#), and employment of the [Ustaše](#) by the Germans to repress the partisans.

During World War 2, all sides in Yugoslav committed [atrocities](#). At the end of the war, the Yugoslav Partisans, under the leadership of [Josip Broz Tito](#) formed the government of the new [Federal People's Republic of Yugoslavia](#) and, later, the [Socialist Federal Republic of Yugoslavia](#). Yugoslavia held together under [Tito's severe rule](#), one marked by [harsh measures](#) against his enemies.

Yugoslavia could not survive long after the death of Tito in 1980. By 1990 the Yugoslav state was ready to break up. It was not a peaceful separation. (Would you expect otherwise?) The result were the bloody [Yugoslav Wars](#) that lasted from 1991 to 2001 and were also marked by [numerous atrocities](#), by all sides.



Figure 13 – Canadian Soldiers in Croatia with the United Nations Protection Force
Credit: [Canadian Department of Defence](#), public domain

In response to the atrocities committed in during the Yugoslav Wars, the United Nations sent a peacekeeping (peace making?) mission, the [United Nations Protection Force](#) to stabilize the situation and prevent further bloodshed. In one notable incident, Croatian militias got into a shootout with Canadian and French troops at the [Medak Pocket](#). The Croatians were not as good shots as the Canadians and while some 27 Croatian militia were killed, no Canadian soldiers died and only four were wounded. Regrettably, during the 15 hour engagement, the Croatians took the opportunity to commit atrocities against the Serbian inhabitants of Medak.

The Yugoslav Wars, which the Croats recognize as the [Croatian War of Independence](#), ended in 1995 for Croatia with the [Erdut Agreement](#). Since [1995](#), Croatia has become [part of the European Union](#) and appears to be putting its bloody history behind it.

Geopolitics – A Dangerous Corner of the World



Figure 14 – Croatian Parliament, Hrvatski Sabor

Credit: [Fred Romero](#), [Creative Commons Attribution 2.0 Generic](#) license

Approximately 20,000 Croats died during the Croatian part of the Yugoslav Wars, 1991 to 1995. In the 29 years since then there has been time to heal and a new generation has grown up. Young Croats will have grown up with [stories about the wars](#) of the 20th Century and may know people who survived atrocities. I doubt that those who fought in the war have much to say about their experiences – old soldiers rarely do. As for those who committed war crimes, they will keep their peace lest they suffer the [fate of people indicted in the International Criminal Tribunal for the former Yugoslavia](#). The Croats will have to come to terms with their past as best they can. [Since the end](#) of the Croatian part of the Yugoslav Wars in 1995, Croatia has had the normal democratic churn in its internal affairs, there seems to be no appetite for violent politics.

In term of external affairs, Croatia's relationship with its neighbours, especially Serbia and Bosnia-Herzegovina, will be clouded by memories of the Yugoslav Wars. Each side remembers their losses and especially the atrocities committed by the others. Resentments may be unhealthy for individuals but they are a [great tool in politics](#). That being noted, given the [history of the Balkans](#), there is little chance that a spirit of forgiveness will prevail among the Serbs, Bosnians and Croats, at least not as long as the horrors of the past are still within living memory. I doubt that the Croats and their neighbours are any worse in this respect than any other people – it's just human nature. However, the leadership of Croatia,

and their neighbours, bear a heavy responsibility to keep their historical resentments in the past, where they belong.

Beyond their immediate neighbours, Croatia's most important external relationship is with their colleagues in the [European Union](#) (EU). The EU provides for a large free-trade zone, such as that enjoyed by the Croats when they were part of the [Austro-Hungarian Empire](#). The bad news is that many important economic decisions that affect Croats are not made by their representatives in the [Hrvatski Sabor](#), but by “faceless bureaucrats” in the [EU Headquarters in Brussels](#). Also, the large economies of [France](#) and [Germany](#) have a great deal more influence on EU decision making than little countries like Croatia. One of the instabilities in the EU is the struggle between local interests and EU interests, as defined by the EU bureaucracy. This is a steady theme in EU politics. It led to [the United Kingdom leaving the EU](#), and could lead to other countries into leaving the EU. Keep an eye on this.



Only time will tell if the EU experiment in providing Europe with a “[Universal State](#)” will succeed. It could go the way of other attempts to unify Europe by such figures as [Charlemagne](#), the [Ottonians](#), and [the Hapsburgs](#) or it might be the beginning of a long period of peace that Universal States can provide. Maybe [Ursula von der Leyen](#) and the other bureaucrats of the EU will succeed where the others have failed.

Figure 15 – Charlemagne – the First to Try to Unify Europe
Credit: [Albrecht Dürer](#) (1471–1528)
**Collection of the [Germanisches Nationalmuseum](#),
[Nuremberg](#), public domain**

Finally, more distant powers such as the [United States](#) and [Russia](#) have an interest in Croatia. In both cases, a lot will depend on how Croatia gets along with its neighbours (and vice versa). A new war between [Croatia and Serbia](#), for instance, would attract the attention of both the USA and Russia. Russia will want to take on their [traditional role as protector of the Orthodox Slavs in Serbia](#) and the United States almost certainly intervene as the leading member of [NATO](#), of which Croatia is also now a member. [Some damn fool thing in the Balkans, as Bismarck](#) would say, could spark a major conflict. Let's hope that cooler heads prevail.

That kind of wraps up my look at Croatia. Follow up on the links if any of this interests you.

Standard Caveat

The purpose of my weblog postings is to spark people's curiosity in geology. Don't entirely believe me until you've done your own research and checked the evidence. If I have sparked your curiosity in the subject of this posting, follow up with some of the links provided here. If you want to, go out into the field and examine some rocks on your own with the help of a good field guide. Follow the evidence and make up your own mind.

In science, the only authority is the evidence.