

INTERVIEW WITH JEAN NICOD, THE KEY FIGURE OF FRENCH KARSTOLOGY OF THE 20th CENTURY

conducted by IVO LUČIĆ

Interview with Professor Jean Nicod is the shortest in the series of interviews published in *Acta Carsologica*. His answers are short and precise, as if they were. He is stingy with words, professor Nicod is devoted to the traditional means of communication: he does not use internet and does not pay particular attention to photos. However, he sent us a map of Mediterranean karst, which is published here as an illustration of his work and his approach to karst studies. The interview as is, was completed two weeks before prof. Nicod's ninetieth birthday. Throughout his life he has demonstrated freshness, viability, good memory and dedication to karst research. This interview is a homage to Jean Nicod and his invaluable contributions to karstology.

Professor Nicod, would you tell us how did you become an karstologist?

I was born in 1923 at Vesoul, Haut- Saône, near Jura plateau. In a secondary school I visited caves in the surrounding of Vesoul. As a geography student at the University at Nancy, I described karst features of Haute-Saône plateaus in my graduate thesis. In 1947 I started to work as a secondary school teacher at “Lycée de Marseille” and preparing the doctoral thesis on Limestone morpholog in Basse Provence. In 1967 I defended the thesis at Aix-en-Provence, where I strongly supported the idea that there are different types of karst in the region, from Calanques to the Grand Canyon de Verdon. I introduced the use of hydro-chemical data to determine denudation rates in karst.

As an assistant of geography at the Faculty of Arts of Aix-en-Provence and at Nice, and from 1949 as a Professor at Aix, I presented problems of karst in SE of France at university courses, and during many field trips.

At Aix-en-Provence, the CNRS foundation “Evolution of karst in the Mediterranean and Alpine regions” enabled research of several doctoral students involved in numerous karst regions. Within Groupe “Procope” (Aix-Tübingen 1987–1990) we started the research on erosion and weathering of dolomites, together with Prof. K.-H. Pfeffer from Tübingen.

Which are the most important phases and milestone in karst research, according to your opinion? (the answer is related to the karst research in France)

Until 1960s research had been dispersed among:

- speleologists (E.A. Martel and his followers),
- geologists (work of B. Gèze),
- geomorphologists (successive editions of Emmanuel de Martonne works, chapter “*The Limestone Relief*”, strongly influenced by J. Cvijić),
- hydrogeologists.

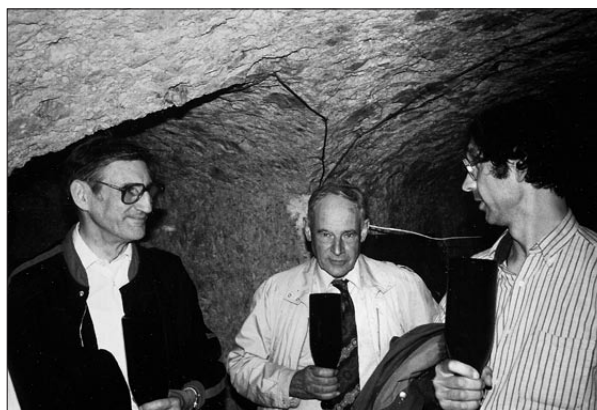


Fig. 1: With Hubert Trimmel and in Richard Maire during «Journées internationales de karstologie en souvenir de Jean Corbel, Metz 1985» in a champagne cellar excavated in chalk (Photo: courtesy J. Nicod).

Commission on Karst Phenomena, founded by the National Committee of Geography, had evolved into the “Association Française de Karstologie” (AFK), founded in 1977, which linked the French karst researchers. It became even more efficient with the journal *Karstologia*, which has been published since 1983. Unfortunately, the commission has not operated since 2000. Recently, however, Dr. Nathalie Vanara has been re-establishing the connection between geomorphologists and geographers.

The journal *Karstologia* was initiated in 1983 by Richard Maire and is now published by the EDYTEM of the University of Savoie at Chambéry (2 issues per year). This publication is connected with the “Fédération Française de Spéléologie” (FFS) and its journal *Spelunca*. The FFS assures the distribution of *Karstologia*, its financing and subscription. AFK also publishes



Fig. 2: One of the numerous field trip guided by Prof. Nicod (Photo: courtesy J. Nicod).

“*Karstologia Mémoire*”, which mainly comprises thesis and is partially financed by the universities and research centers.

Two researchers initiated the relations between speleological research and geomorphological studies:

- Jean Corbel – doctoral thesis Lyon 1957 – *Les Karsts du Nord-Ouest de l'Europe et des quelques régions de comparaison: étude sur le rôle du climat dans l'érosion des calcaires* (Karsts of NW Europe and other regions: the role of climate on erosion rates in limestone),

- Richard Maire – doctoral thesis Nice 1990 – *La Haute Montagne Calcaire* (Limestone of High Mountain).

J. Corbel was the first to use water analyses to evaluate recent dissolution rate (Karst denudation). R. Maire was the first in France who used isotopic datings to determine evolution phases of a karst system (measurements of speleothems of the Galerie Arandzadi of Pierre-Saint-Martin in the Western Pyrenees, datings made by Y. Quinif at Mons).

What are the most important things in recent karstology: trends, studies and publications?

Beside interdisciplinary work of geologists, hydrogeologists, and bio-speleologists, I have to stress two points:

- The recent importance of paleo-environmental research based on cave sediments (especially speleothems), and the carbonate tufa on the slopes or in the valleys of karst massifs.

- Relations with archaeologists, either in connection with the study of caverns used by man through Prehistory and History, or through the co-operation at datings and study of paleo-environmental conditions.

Numerous French karstologists are working on karst hydrogeology, on the problems of aquifer structure and spring flow, such as the Mediterranean submarine springs. Several speleologists are working with archaeologists. Fine examples are the work of Jean-Jacques Delannoy and colleagues from Chambéry in the Chauvet cave (Ardèche) and the work Laurent Bruxelles in the old prehistoric sites in Southern Africa. Historical human presence in numerous caves were also recognized by Christophe Gauchon (1997). The karstologists and speleologists play an important role in the definition of the geomorphosites and the protection of the karst heritage and show caves. Most French karstologists have great interest in environmental problems in karst areas of France and other countries, particularly in Morocco and also in tropical areas (Salomon & Pulina 2005).

Some new trends in karst research in France are given in “*Grottes et karsts de France*”, edited by Philippe Audra in 2010:

- the structure of the endokarst related to the tectonics and paleoclimatic evolution, particularly in the Alpine Karsts: Philippe Audra (1994), Fabien Hobléa (1999) in the Alps, Nathalie Vanara (2000) in the western Pyrenean range,

- relation of karst evolution to the sea-level changes, particularly to the Messinian salinity crisis: research in the karst networks of Languedoc by Hubert Camus (1997) and in Saint-Marcel cave in Ardèche canyon by Ludovic Mocochain (2006),

- the relation between the karst structure and hydrological functioning (base-level control, phreatic or epiphreatic conditions, hypogene caves ...),

- dating of karst evolution and paleoclimatic phases by radiometric analyses of speleothems, initiated by Richard Maire (1990) in the Aranzadi gallery of the Pierre-Saint-Martin in western Pyrenean range,

- the studies of the paleokarst and paleoforms, such a giant karrens, megadolines, old caves ghost rock weathering (examples in Southern Causses by Laurent Bruxelles 2001) and their deposits (bauxites, ferricrusts, *terra rossa* etc, recent inventory of the ferricrusts in the Parisian Basin by Jean-Paul Fizaine (2012),

- studies of the geomorphological evolution of the poljes and valleys with fine examples in chalk-karst in Normandy by Joël Rodet (2003), the cover-karst of Barrois by Stéphane Jaillet (2005), the role of karst network in the famous piracy of the upper Moselle by Benoît Losson (2004) and also dating of the stages of deepening by travertine deposits in Quercy-Périgord by Frédéric Hoffmann (2005).



Fig. 3: On a field trip in Chalk karst of Normandy in 2003 (Photo: Nadja Zupan Hajna).

A selection of important recent studies by French karst researchers:

Audra Ph., 1994: *Karsts alpins, genèse des grands réseaux souterrains*.- Karstologia Mémoire n°5, 279 p.

Bruxelles L., 2001: *Dépôts et altérites des plateaux du Larzac central: Causses de l'Hospitalet et de Campestre (Aveyron, Gard, Hérault). Evolution géomorphologique, conséquences géologiques et implications pour l'aménagement*.- Document BRGM n°304, 266 p.

Camus H., 1997: *Formation des réseaux karstiques et creusement des vallées (Larzac-Hérault)*.- Karstologia, 29, 23–40.

Delannoy J.J., 1997: *Recherches géomorphologiques sur les massifs karstiques du Vercors et de la Transversale*

de Ronda (Andalousie). Les apports morphogéniques du karst.- Ed. du Septentrion, Lille, 677 p.

Fizaine J.P., 2012: *Les paléokarsts et les formations ferrugineuses associées dans le Bassin Parisien et ses bordures: caractérisations et évolutions géomorphologiques*.- Thesis Nancy 2, 2 vol., 671 p.

Gauchon Ch., 1997: *Des cavernes et des hommes. Géographie souterraine des montagnes françaises*.- Karstologia Mémoire n°7.

Audra, Ph. (editor), 2010: *Grottes et karsts de France 2010*.- Karstologia Mémoire n°19, 358 p.

Hoblea F., 1999: *Contribution à la connaissance et à la gestion environnementale des géosystèmes karstiques montagnards*.- Thesis. Lyon 2, 995 p.

Hoffmann F., 2005: *Les tufs et travertins en Périgord-Quercy*.- Karstologia Mémoire n°13, 260 p.

Jaillet S., 2005: *Le Barrois et son karst couvert*.- Karstologia Mémoire n°12, 235 p.

Losson B., 2004: *Karstification et capture de la Moselle (Lorraine, F): vers une identification des interactions*.- Mosella (Metz) XXIX n°1–2, 491 p.

Maire R., 1990: *La haute montagne calcaire*.- Karstologia Mémoire n° 3, 729 p.

Mocochain L., Bigot J.Y., Clauzon G. 2006: *La grotte de Saint-Marcel (Ardèche), un référentiel pour l'évolution des endokarsts méditerranéens depuis 6 Ma*.- Karstologia, 48, 33–50.

Rodet J., 2003: *Karst et Craie en Normandie: une approche géographique*.- Actes Journées AFK Rouen 2003, p.17–31.

Salomon J.N. et Pulina M., 2005 – *Les karsts des régions extrêmes*.- Karstologia Mémoire n°14, 220 p.

Vanara N. 2000: *Le karst des Arbailles*.- Karstologia Mémoire n°8, 320 p.

How you see Dinaric Karst? With which centers and colleague from Dinaric karst did you have productive cooperation?

The scientific research of Dinaric karst is very important due to multiple reasons: its extent, interdependence between hydrogeology and karst units, the variety of geomorphological types, relations with man's works (double meaning of the term *polje*), and classical landscape.

I gained a lot from Josip Roglić whom I met for the first time in Languedoc in 1968 and with whom I made a field tour through Croatia and Bosnia in 1975. I gained from the International Speleological Congress at Ljubljana 1965, and by visiting Montenegro. Many relations with my Slovene colleagues were of great benefit: Ivan Gams, Peter Habič, Andrej Kranjc. I have attended many meetings, colloquiums, congresses and field trips organized by the Karst Research Institute in Postojna. Thanks to C. Milić I visited the karst of Eastern Serbia in 1980

and the area around lake of Ohrid in Macedonia with D. Manaković (1982).

These numerous meetings and excursions enabled me to write different papers and works: “*Les karsts dinariques, paysages et problèmes*”, co-edited by SAZU (Ljubljana 2003) and l’Association Française de Karstologie.

Which world karst areas you would particularly emphasized and why?

From the most classical and studied I should mention:

- Les Grands Causses (due to E.-A. Martel from the end of the 19th century).
- Jura (in France and Switzerland).
- Schwäbische Alb.
- Different Pre-Alpine massifs of Germany, Austria (especially Dachstein), France (Vercors, Chartreuse, Bauges, Dévoluy, etc.), Italy (Dolomites, Lessini, etc.), Slovenia (Triglav), Switzerland (Hölloch Karst, Siebenhengste, etc.).
- Attached map shows the typology of the Mediterranean Karst.
- Question of springs of Garonne and later the famous Pierre-Saint-Martin attracted international focus upon the karst of Pyrenees.
- In France the karst research intensified recently especially on the plateaus of Ardèche, in Quercy-Périgord, and on the “chalk” karsts of Normandy and Champagne.
- And in Spain (Andalusia) ridges of “Betiques”, in Italy Abruzzes, Nizke Tatry in Slovakia, highland karst of Krakow-Czenstochowa in Poland, plateaus of the Middle Atlas in Morocco, Taurus in Turkey, Mt. Lebanon, etc.
- The works of Jakucs on the caves of Transdanubian Mts. in Hungary are reference works on the functioning of hydrothermal karst.
- It was possible to define the evolution types of tropical karst by the karsts of Cuba, Porto-Rico, Jamaica, and Indonesia. But the most extensive and variable are karsts of Southern China (see the studies of R. Maire in collaboration with the institute of Guilin).

- According to the works of G. Rossi and J.-N. Salomon I think that the karst of Madagascar is of great variety and the karst of Yucatan is interesting especially regarding the difficulties of finding water during the ancient civilisation of Maya.

How you see problems of the diffusion of the karst knowledge?

In France, the manual of J.-N. Salomon “*Précis de Karstologie*” (two editions already, 2000 & 2006) is used at the moment. The journals, such as *Acta carsologica* (Ljubljana) or *Spelunca* and *Karstologia* (France) are widely distributed. These journals are read and discussed by scientists as well as by “sport and explorer” speleologists.

Tourist visit of famous sites such as National Park of Plitvice or Grand Canyon of Verdon and caves as Postojna, Aggtelek or Padirac, can be an introduction to many different aspects of karstology for the great public as well as for pupils. It is supported by numerous guide-books and didactical works.

Biography of Prof. Jean Nicod

Born on March 25, 1923 at Vesoul (Haute-Saône Department).

University career:

- Geography “Professor agrégé” (1947).
- Grammar school professor at Nancy, later at Marseille (1947–53 and 1955–57).



Fig. 4: At Doux de Coly in 1992 with Prof. Gams (left) and Michel Chardon (right) (Photo: Fabien Hobléa).

- Researcher probation at CNRS (1953–55).
- Director of the Regional Centre of pedagogical documentation of Marseille (1957–60).
- Assistant and “Maître Assistant” at the Geographical Institute of Aix-en-Provence (1959–65).
- “Maître Assistant” at the Faculty of Arts of Nice (Geographical Section) (1965–68).
- Assistant-Professor (Maître de Conférences), later Professor at the Geographical Institute of Aix-en-Provence, University of Aix – Marseille II (1968–89).
- Professor Emeritus of the Geographical Institute of Aix-en-Provence (1989–93).

Scientific activities and awards

- The founder of the ERA 282 of the CNRS, at Aix-en-Provence: “*Evolution karstique dans les milieu méditerranéens et alpins*” (Evolution of karst in the Mediterranean and Alpine environments), which later became URA 903 of CNRS (1971–83).
- The president of the Commission of Karst Phenomena and of the National Committee of Geography and of the Karstological Association of France (A.F.K.) (1977–86).

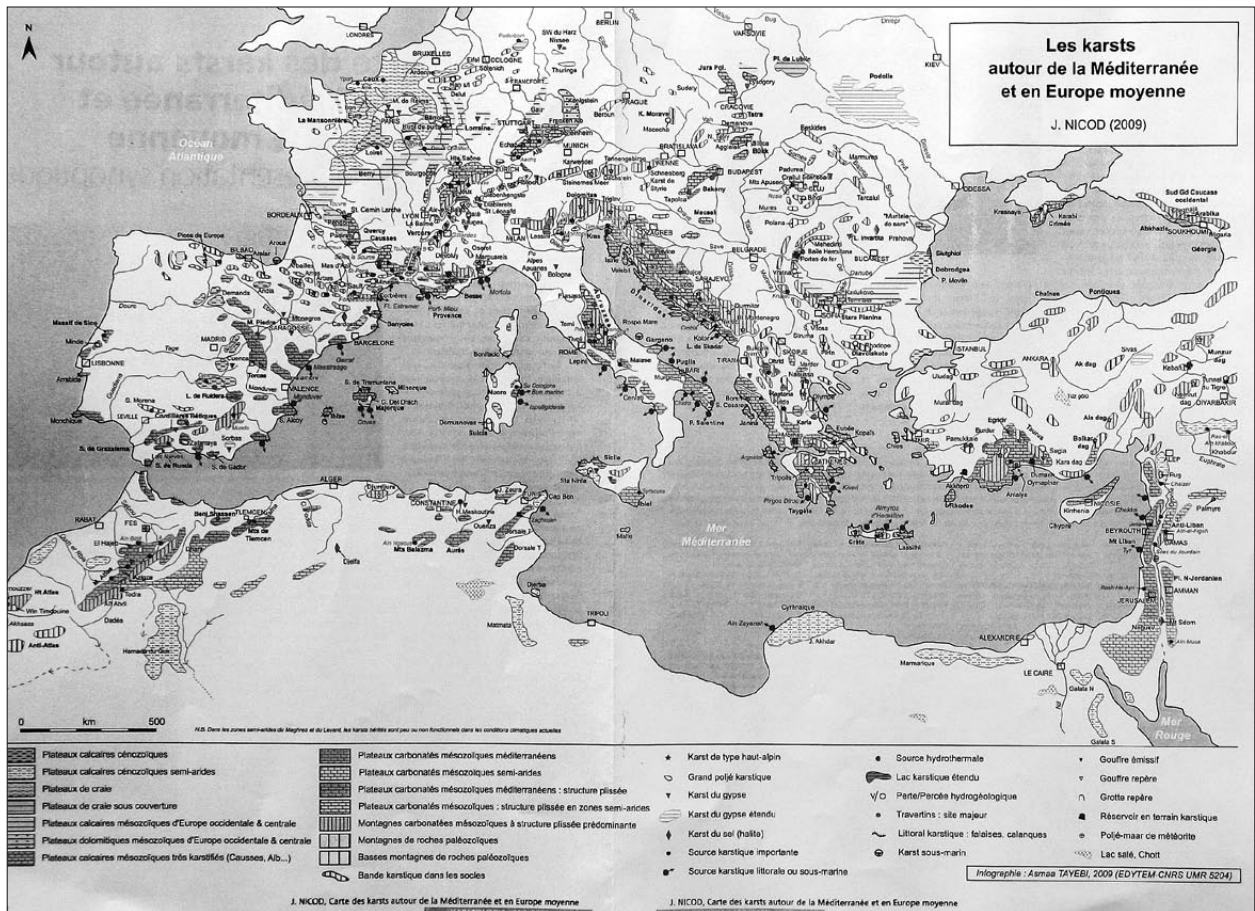


Fig. 5: The map of Mediterranean karst compiled by J. Nicod.

- The co-leader of the Group *Procope Aix-en-Provence*-Tübingen “*Erosion et alteration des Dolomies*” (Erosion and weathering of dolomite) (1987–90), together with Prof. K.-H. Pfeffer.

- Doctor *honoris causa* of the Silesian University (Katowice – Sosnowiec) (1994).

- Corresponding member of the Slovenian Academy of Sciences and Arts (Ljubljana) from 2002.

- Honorary President of the journal *Karstologia*.

N.B. The work “*Karsts et évolutions climatiques – Hommage à Jean Nicod*”, (Karst and climate dedicated to Jean Nicod) edited by J.-N. Salomon and R. Maire, Presses Universitaires de Bordeaux (1992), 520 pp.

Thesis* and works on karstology by J. Nicod:

- *Morphological research of limestone Basse-Provence (Thesis Aix-en-Provence 1967) (Louis-Jean, Gap, 1967) 557 pp. + 7 maps in annex.

- Limestone Lands and Landscapes, collection “Le Géographe” SUP (Presses Universitaires de France), Paris, 1972, 244 pp.

- The Dinaric Karsts, paysages and problems, Co-edition Institut za raziskovanje krasa, *Carsologica*, ZRC SAZU – Ljubljana 2003 – AFK *Karstologia Mem.*, No. 10, 183 pp., a map in annex.

- Many papers on karst geomorphology and hydrology, on covered karst, paleokarst, gypsum karst, karst springs and use of its water, tufa and travertines, and on different karst sites ..., mainly from South-eastern France, Jura, Dinaric lands, and Morocco.

Most recent important contribution:

- Les Gorges de Trévans dans le front subalpin – un site exceptionnel des Alpes de Haute-Provence. *Etudes de Géographie Physique* (Nice) n° XXXVIII, 2011, p. 23–42.

- My last book: Sources et sites des eaux karstiques (Sources and sites of karst waters), *Méditerranée*, Special issue, Aix-en-Provence 2012, 277 p.