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Could last cold spell 13000 years ago resulted from extraterrestrial impacts?

Gunther Kletetschka
Charles University in Prague, Czech Republic

Climate has been changing in the past 20 thousand years. When ice age was ending around 15 thousand years ago, climate globally was warming up, however a transient event changed the global warming pattern and the climate changed back to cold for another thousand of years. When looking closer on details about this climate change, Younger Dryas, it became clear that this event has different character, because it was associated with large scale megamammal extinction. Also many cultures living at this time were decimated and forced to change their life style. For example wide spread Clovis culture in North America has disappeared. Cultures living in North Africa and Middle East changed their style of living from game hunters to agriculture societies. We identified globally extended layer of microspherules that is associated with this date, when climate started to change from warm back to cold. We have evidence for lack of oxygen and change in adaptation of plant material during this event.

kletetschka@gmail.com

Strain partitioning and heterogeneous sub-simple shearing in the hinterland-dipping mid-crustal gneissic channel flow nappes of the Zagrosorogensis, Southwestern Iran

Khalil Sarkarinejad and Abdolreza Partabian
Shiraz University, Iran

Systematic field measurements of foliation and lineation of the metamorphosed cover sequences and the sheared quartzo-feldspathic gneiss nappes in the Ghouri area reveal three gneissic ductile extrusions nappes with elongated semi-elliptical shapes parallel to the thrusts of the Zagros Thrust System of the Zagros orogenesis. These extrusions cored by the sheared quartzo-feldspathic gneiss, orthogneiss, garnet amphibolite, eclogite, blue schist and covered with the sequences of phyllite, phyllonite, muscovite schist and deformed conglomerate. The ductile extrusions are called ChahSabz, ChahGoni and Kuh-e-Zard nappes. The hinterland-dipping gniessic ductile extrusion nappes resulted from the interaction of the lower to middle hinterland involved-basement at 651°±90° C and hot subducting deformed Tethyan oceanic crust. Gneissic nappes flow were squeezed between the Zagros transpression curved boundary zones that is inclined at an angle α=25°. The estimated mean kinematic vorticity numbers of these three nappes are 0.65±0.6, 0.81±0.1 and 0.73±0.17, respectively. The mean kinematic vorticity (W_m) and finite strain (R_s) measurements of the ChahSabz, ChahGoni and Kuh-e-Zard ductile extrusion nappes indicate that the component of simple shear relative to pure shear component are ~45-(55% pure shear), 60%-(40% pure shear) and ~52%-(48%pure shear). This show concentration and localizations of high strain is highly heterogeneous in each nappe during ductile flow. Constructed finite strain ellipsoid based on deformed markers in the cover sequences show that the X-axis of the strain ellipsoid plunges with an angle ϕ=61° relative to the boundary zone. The steeply plunging stretching lineations were primarily controlled by ductilel flow. Basement detachment flow of the middle to lower crust source was progressively led to hinterland-dipping ductile extrusion. The X-, and Y- axes of the strain ellipsoid during this progressive deformation, rotated clockwise whilst the Z-axis rotated counterclockwise relative to the N55°W thrust sheets, defining deformation with triclinic symmetry.

sarkarinejad@ susc.ac.ir