

University of Anbar

College of Science – Applied Geology Department

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4th Stage

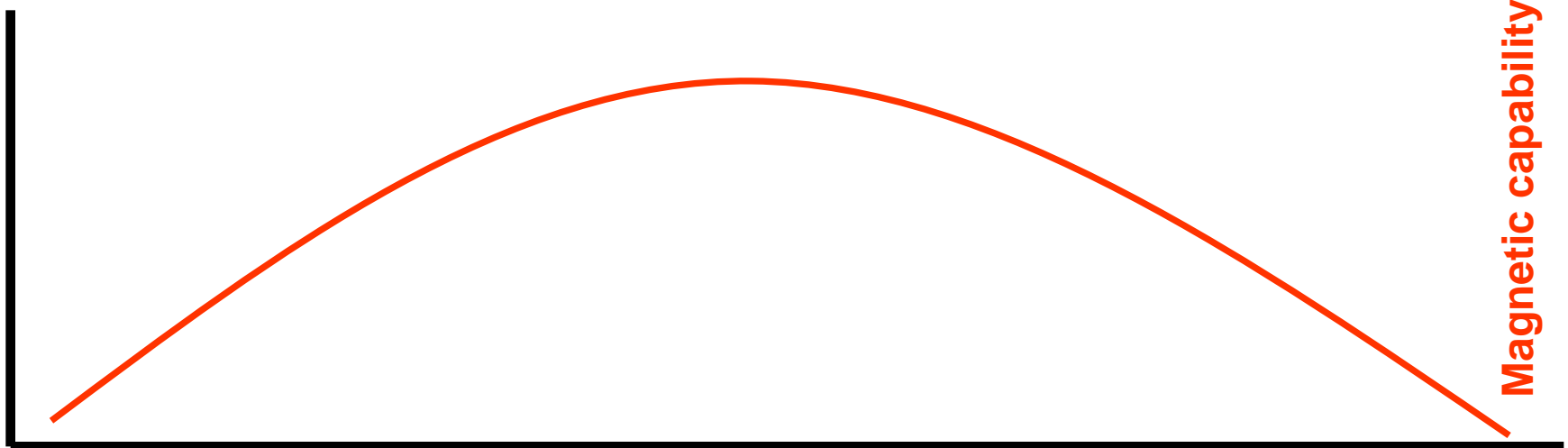
Quaternary

Lecture 11 : Paleomagnetism

Paleomagnetism

The first paleomagnetic studies began with polar wandering and plate tectonic . The idea of that principles is (Rock magnetism) that give the general characteristic of the Rock . The atoms orbits need to give or lost some electrons to reach the equivalent state . Most famous state the orbit have + 2 electron more than equivalent state or - 4 electron .

Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
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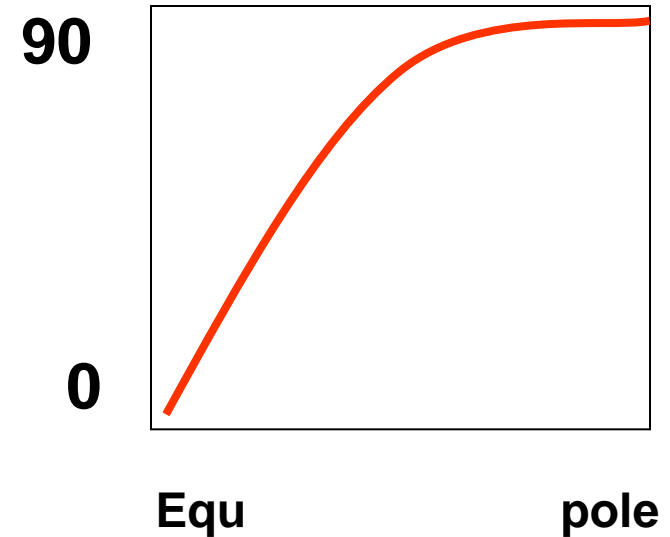


All the material have 3 types of magnetic activity :

- 1 – Diamagnetic : very weak magnetic field .. Random directions . Expm
Qz – feldspar
- 2 – Paramagnetic : many magnetic atoms with same magnetic field but
the total average direction still weak . Expm : olivine – pyroxene
- 3 – Ferromagnetic : the important , all the magnetic momentum have
same direction so strong magnetic field .

Some times the Ferromagnetic Atoms exist at place with opposite magnetic direction (the average) = zero , but when the temperature increase to reach critical point the Atoms lose their magnetic properties and change to Paramagnetic because of distribution of inside structure . When it cold the atoms will arrange Them selves with same direction of main magnetic field already exist at that region, this magnetic called **TRM** thermo remnant magnetism . when the rock lose their magnetic properties (578 C° for magnetite) . the original magnetic called **NRM** .

the most important type called depositional remnant magnetism **DRM** , happen when all past types of magnetism effect by weathering and the loose particles deposits them selves with the same direction of present magnetic field domain the area .

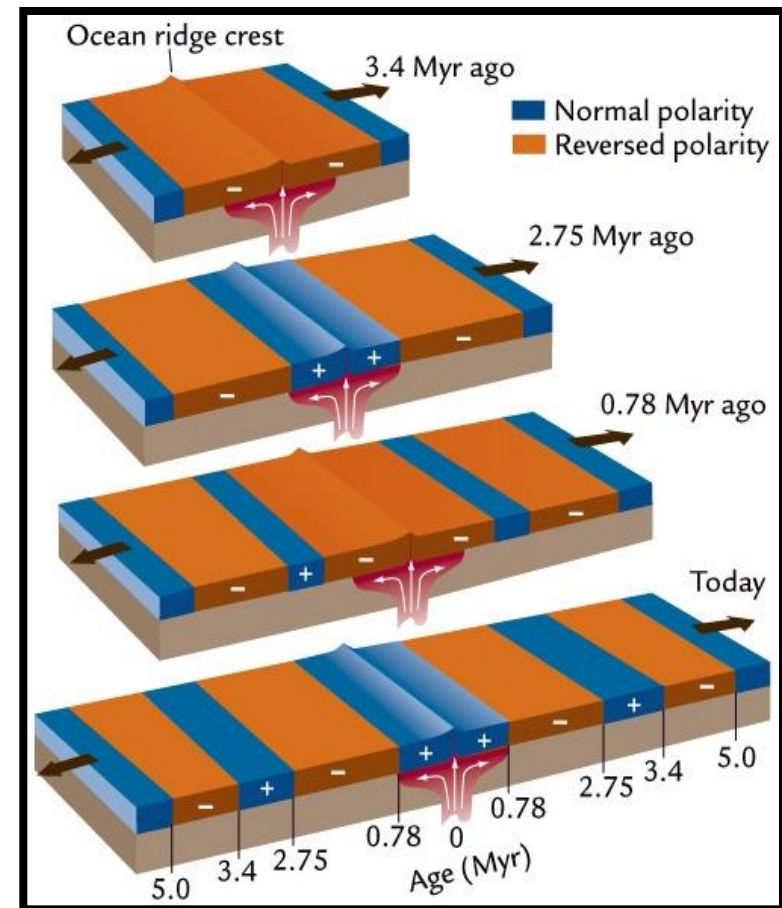
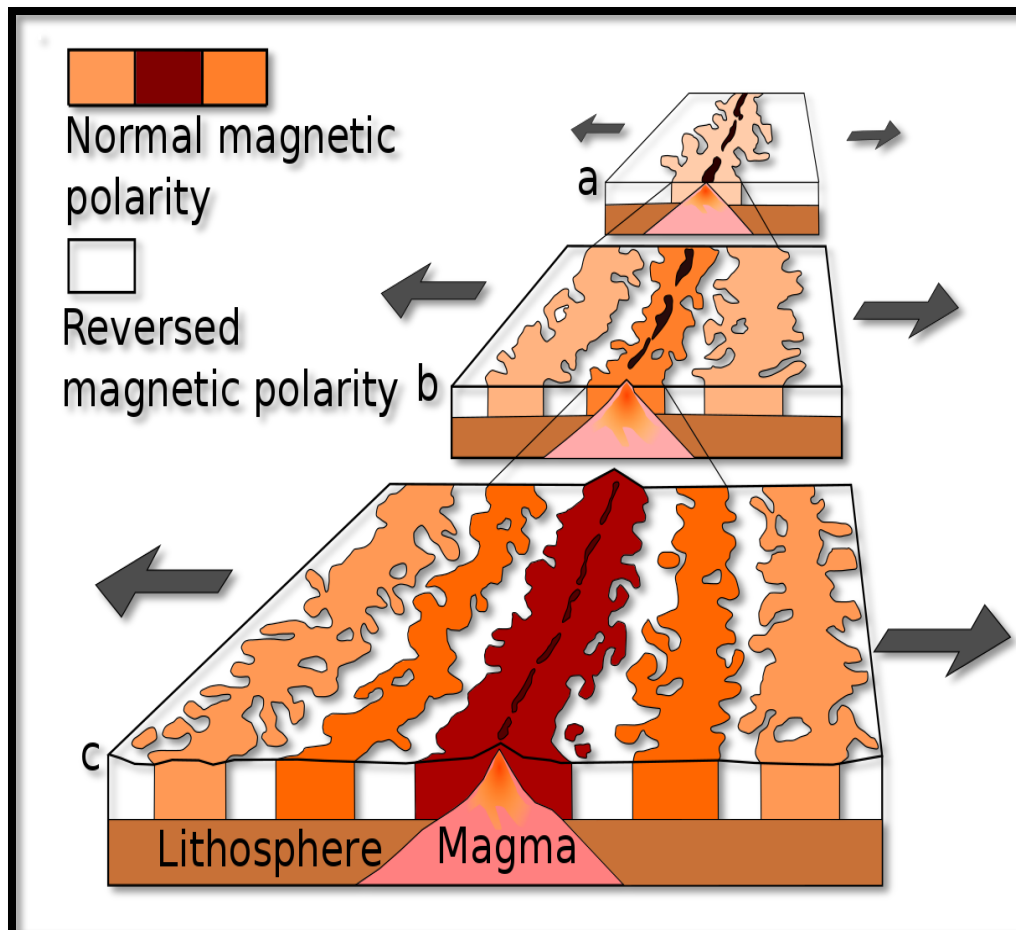


The magnetic fields that rock have maybe with same or opposite with the general magnetic field called Reversed magnetism . Many explanations give to the understand this case :

1 – the earth magnetic poles change positions periodically

2 - some mineral change their magnetic field because of the many equivalent they have . Exp +2 + 3, with period 1000000 – 100000 (rare natural case)

Most igneous rocks at ocean can give the records of magnetic poles reverse by studying the direction of magnetic direction exist in it .



References

Glacial and Quaternary Geology

http://www.colby.edu/geology/GE354/Index_GE354.html

Internet Remote Sensing Lectures sites