

SIGNIFICANCE OF CLIMOSEQUENCE ON GENESIS, DEVELOPMENT AND MINERALOGY OF SOILS FROM NORTHERN IRAQ

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ABSTRACT

Five pedons were selected within five locations from Northern Iraq, with a relative climatic variation of Annual rainfall and temperature. The locations are Wermawa in Sulaimani, Gerderash in Erbil, Semeel in Duhok, Fayda in Mosul and Alton-kopriin Kirkuk. Soils were classified according to soil taxonomy (USDA) as Mollisols, Inceptisols, Vertisols, Aridisols respectively. Physical analysis revealed that the results of the particle size distribution generally indicated a relatively high clay content of all the soil samples and a lower content at the surface horizons as compared to that of underlying horizons for all pedons, an increase in clay content with an increase in depth may be due to the lessivage process as a result of leaching. Generally the values of Fine clay/Coarse clay ratio of all studied soils increased in lower horizons and have lowest value in upper horizons, these values increased with the increase in depth that refers to the effect of climatic conditions especially precipitation which is related to the occurrence of many soil forming processes. The value of Iron oxides in clay fraction of studied pedons irregularly increased with the increase in depth and the movement of clay particles which leached from upper horizons to lower horizons as a result of rainfall effect which caused the eluvation and illuvation processes. The amount of total carbonate content generally increased with increasing the depth these due to the origin of parent material that was derived from limestone which is generally composed of carbonate minerals that were translocated from upper horizon and accumulated in lower horizon as a result of gains and losses as well as wet and dry processes. The active carbonates of studied pedons have the same distribution pattern that they generally increased with increasing depth. This pattern is concurrently in agreement with clay distribution in the same pedon because of active carbonate existing in clay particles size and translocated from upper horizons to lower horizons. The results proved the effect of climatic conditions that causes an intensive activity of some pedogenic processes which in turn led to the development of study soils. The results of mineralogical analysis of the clay fraction with using X-Ray diffraction indicated that the present clay minerals in study soils were Smectite, Vermiculite, Kaolinite, Palygorskite, Illite, Chlorite and existing of interstratified clay minerals Illite-Smectite and Illite-Vermiculite minerals.

Keywords: Climate, Clay, Iron oxides, Carbonate, Pedogenic processes, Clay minerals.