Pedoechemical studies on some valies of the eastern coast of a.r.e

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The studied wadis is a part of eastern desert .The first wadi namely Hawdayn.It is located on the south east of the eastern desert between longitude 35° 22- and 35° 37- east, and latitude 23° 00- and 23° 08- north, to get more soil information on such area ,7 soil profiles were selected from the prevalent five geomorphic units, namely:1-out wash plain 2-wadi Plains 3-channel stream bed 4-littoral zone 5- Alluvial fans.The second wadi namely Qena At is located between longitude 32° 31 and 33° 8- east, and latitude 26° 45- and 26° 45- , to get more soil information on such area,10 soil profiles were selected from the prevalent four geomorphic units, namely;1-mouth hills 2-wadi plains 3-terraces 4-fluviatile hummocks soil profiles of two wadis were morphologically described . 1)Physical and chemical properties:A)Wadi Hawdayn:a)Soil texture is generally sandy to loam and varies to some extent, from one geomorphic unit to another ,being sandy loam for soils of out wash plain ,sandy for soils of wadi plains, sandy to loamy sand for soils of channel stream bed ,loamy sand, sandy loam ,and clay for soils of littoral zone ,while being sandy ,sandy loam ,loamy sand, sandy clay, and loamy for soils of Alluvial fans.b)Soils salinity differs appreciably from one locality to another. For instance, soils of the out wash plain are non saline, soilsof wadi plains are non saline to slightly sal channel stream bed are non saline. Soils offitt very strongly saline, while soils of Alluvi moderately saline to strongly saline.c)Soluble cations are dominated by Na+ followed,while K+ is the least abundant.Soluble anio follow the order ci-> HCO3- > SO4-- except fs wash plain where Cl- exceeds SO4-- and HC Alluvial fans, wadi plains, channel stream beane. Soils of ral zone are 1 fans areby Ca++ and s generally r soils of out 3- in soils of ,and littoralzone.d)Soil reaction is generally midly alkaline to strong y alkaline as shown by pH values which range between 7.6 and 8.8.e)Total carbonate content varies widely from one geomorphic unit to another and even in the same geomo s hic unit. It ranges from 1.8 to 3.15, 1.09 to 2.10,0.85 to 3.20, 1.75 to 3.00 and 2.60 to 4.90 in the soils of out wash plain, wadi plains, channel stream bed ,littoral zone,and A luvial fans respectively.This indicates non calcareous nature of soils.f)Gypsum content ranges from 0.90 to 1.70 %,0.95 to 3.90%,0.90 to 4.15 %, 8.00 to 11.70 %,and 1.95 to soils of out wash plain, wadi plains, channel littoral zone, and Alluvial fans, respectively. g)0 content is generally very low in all profiles rep soils under investigation. It ranges between 0. owing to the prevaling aridity of the region w the decomposition of organic matter..10 % in the stream bed, ganic matter esenting the 9 and 0.8 % ich facilitate111B)Wadi Qena:a)Soil texture is generally sandy, loamy sand ,sandy loam and loamy and varies to some extent, from one geomorphic unit to another ,being loamy for soils of fluviatile hummocks ,loamy sand for soils of terraces and mouth hills ,while varies between sandy to loamy sand for soils of wadi plains.b)Soils salinity differs appreciably from one locality to another. For instance, soils of the mouth hills are slightly saline, soils of wadi plains are non saline to strongly saline. Soils of fluviatile hummocks are moderately saline to strongly saline,and terraces are slightly saline to strongly saline.c)Soluble cations are dominated by Na+ followed by Ca++ and Mg++ ,while K+ is the least abundant . Soluble anions generally follow the order SO4- > C1-> HCO3 In the soils of mouth hills ,where in soils of wadi plains,terraces and fluviatile hummocks the anions in the order C1-> SO4- > HCO3-• d)Soil reaction is generally neutral to moderately alkaline as shown by p” values which range between 6.6 and 8.1.The values of p” tend to slightly acidity in some layers which characterized by very strongly saline in fluviatile hummocks unit.e)Total carbonate content is

very high as a result of lime rocks source.This indicates non calcareous nature of soils.f)Gypsum content is relatively low except for the fluviatile hummocks unit.g)Organic matter content is generally very to between 0.08 and 0.70 % owing to the prevaling region which facilitate the decomposition of orga2-Cation exchange capacity and exchangeable catCation exchange capacity of wadi Hawdayn between 1.6 meq/100g soil to 11 meq/100 g soi exchange capacity of the soils of wadi Qena is (fluctuated between 0.72 and 16.70 meq/100 g soi widely from one geomorphic unit to another and fri to another too according to its texture .Regarding t exchangeable cations in the different soil pre Hawdayn the data indicate that Ca++ dominates the cations followed by Mg++, Na+,and K+,with regard wadi Qena the data illustrate that Ca++ exchangeable cations followed by Mg++, Na+,and3)Trace elements ContentsA) wadi Hawdayn:a)Total zinc content varies from 5 to 40 ppm. W content in soils of the Alluvial fans, while its 1 characterizes the soils of littoral zone.b)Total Manganese content ranges from 10 to 380 0 highest content in soils of Alluvial fans whi content is confined to soils of littoral zone.c)Total Iron content varies widely from 1500 to 160 its highest content in soils of the Alluvial fans of the littoral zone has the lowest content..It ranges ridity of the is matter.on:varies widely ,whle Cation generally low).C.E.0 vary m one profile the nature of files of wadi exchangeable to the soils of ominates the +.th its highest west content4pm. With its e its lowest0 ppm. with hereas soilsd)Total Copper content ranges from 2 to 30 ppm. the highest values are found in the soils of Alluvial fans, while the lowest values are associated with soils of out wash plain.The vertical distribution of trace elements is discussed in light of the statistical measures,i.e., weighted mean , trend , and specific range, suggested by Oertel & Giles (1963).B) wadi QenaTotal zinc content varies from 17 to 50 ppm. With its highest content in soils of terraces, while its lowest content characterizes the soils of mouth hills.Total Mn content ranges from 160 to 430 ppm. With its highest content in soils of fluviatile hummocks while its lowest content is confined to soils of terraces.Total Iron content varies widely from 1900 to 12000 ppm. with its highest content in soils of wadi plains whereas soils of fluviatile hummocks has the lowest content.Total Copper content ranges from 6 to 20 ppm. the highest values are found in the soils of fluviatile hummocks, while the lowest values are associated with soils of mouth hills. The vertical distribution of trace elements is discussed in light of the statistical measures,i.e., weighted mean , trend , and specific range , suggested by Oertel & Giles (1963).4)Amorphous inorganic materials contents: in soils of wadi Hawdayn are very low. Iron is the most abundant, followed by alumina and silica. The molar ratios are low and this may be taken as an indication of contribution of siliceous materials to the soils parent material.Amorphous inorganic materials contents in soils of wadi Qena are very low. Silica is the most abundant, followed by alumina and iron . The molar ratios are low to high and this may be taken as an indication of more contribution of siliceous materials to the soils parent material.5)Mineralogy of the sand fraction: a)Light minerals in wadi Hawdayn:Quartz predominates the light minerals con sent with less pronounced amounts of feldspars of which orthoclase and plagioclase are the principal members while microcline is the least abundant.b)Heavy minerals in wadi Hawdayn:Heavy minerals are dominated by opaques .Non opaques are dominated by pyroxenes, amphiboles, epidote, zircon, biotite, tourmaline, and rutile a descending order.Garnet ,staurolite, kyanite, silimanite, andolusite and monazite are present in moderate amounts while apatite mineral is of less pronounced occurrence or even - absent. The index mineral is generally moderate 7.1-19.7. Moreover a test of uniformity and development of soil profiles leads to the conclusion that the soil constituting each profile are heterogenous either due to their multi -origin or due to the subsequent variation along the course of sedimentation .Also differential weathering during transition of soil materials prior to deposition, contributes, to an indeterminate extent to the survival of sediment3 in certain mineral assemblage or their alteration and degradat on. thus the soils are young from the pedological point of view.Mineralogy of the sand fraction:a)Light minerals in wadi Qena:Quartz predominates the light minerals content with less pronounced amounts of feldspars of which orthoclase and plagioclase are the principal members while Microcline is the least abundant.b)Heavy minerals in wadi Qena:Heavy minerals are dominated by opaques .Non opaques are dominated by amphiboles, pyroxene, epidote, zircon, biotite, tourmaline , rutile,Garnet ,staurolite,kyanite,silimanite,andolusite and monazite , apatite are present in moderate amounts while apatite mineral is of less pronounced occurrence or even absent. The index mineral is

generally moderate 4.4-34.80.6- Uniformity of soil parent materials:Uniformity and development of soil profiles of two wadis (Hawdayn and Qena)leads to the conclusion that the soil constituting each profile are heterogenous either due to their multi -origin or due to the subsequent variation along the course of sedimentation .Also differential weathering during transition of soil materials prior to deposition, contributes, to an indeterminate extent to the survival of sediments in certain mineral assemblage or their alteration and degradation. thus the soils are young from the pedological point of view.7-Sedimentology analysis:Sorting values of wadi Hawdayn indicate that the sediments are poorly ,very poorly and moderately and well sorted sediments which points out to the role of aqueous and both of water and wind action for the transportation anddeposition of the sediments .Skewness values in studied soils are commonly positively skewed ex layers of profiles 3,4,5,and 6.Kurtosis values a kurtic and lepto kurtic ,platy or very platy kurtic.Applying the discriminant function of reveals that the sediments forming the investiga mostly deposited under aqueous environments.Sorting values of wadi Qena indicate that are very poorly ,to poorly,moderately and well so which points out to the role of aqueous and bot wind action for the transportation and depos sediments. Skewness values indicate that the sediments are fine skewed ,coarse skewed ,very c ,to near symmetrical.Graphic kurtosis shows that of the studied soil profiles are platykurtic ,ver leptokurtic and very leptokurtic.Applying the discriminant function of reveals that the sediments forming the investigate Qena are mostly deposited in deltaic enveron turbidity currentconditions except for the soils hummocks which seemed to be deposited in w while these soils were depicted to be deposit environment.8-Mineralogy of the clay fraction:The results of X-ray diffraction analysis Kaolinite is the predominant clay minerals follow (montmorillonite) with less pronounced o interstratified minerals, illite, chlorite, and palicate that the ept for some very leptoahu (1964) ed soils arehe sediments ed sediments of water and tion of the studied soils arse skewed he sedimentsplatykurtic,ahu (1964) soils of wadi rent and /or of fluviatile ter condition d in aeolianrevealed that d by Smectite currence of groskite. Theidentified accesory minerals are mainly dominated by Quartz followed by feldspars while calcite and dolomite are absent in some soils of wadi Hawdayn (wadi plains and Alluvial fans).With regard to the soils of wadi Qena the X-ray diffraction analysis show that Kaolinite is the predominant clay minerals followed by smectite with less pronounced occurrence of interstratified minerals in soils of wadi plains while it is absent in soils of terraces and fluviatile hummocks ,and illite chlorite, palygroskite. The identified accesory minerals are mainly dominated by Quartz followed by feldspars and calcite while dolomite is absent in some soils of wadi Qena (terraces).9-Soil classification:This was carried out following the most recent American System ”Soil Taxonomt”,Soil Survey Staff,(1951 and 1994), down to the family level , the studied soils have been classifiedinto two soil orders,namely Entisols,and Aridisols. 1-order EntisolsSuborder :Orthents.Greatgroup:Torriorthents.(Profiles of wadi Hawdayn No.1,2,3,4,6,and 7).2-order Aridisols.Suborder:SalidsGreatgroup:Aquisalids (profile of Wadi Hawdayn No.5) Suborder :CalcidsGreatgroup:Haplocalcids(Profiles of wadi Qena No.8,9,10,11,12,13,141,and 16) SubordensalidsGreatgroup:Haplosal ids(Profiles of wadi Qena No.15,and 17)10-Land EvaluationApplication of the capability index for the studied soil profiles,reveals that the studied soil profiles of w di Hawdayn are placed between (H) and (IV) grades as follow:1-Grade (II):Good soils include profile 1.2-Grade (III):Fair soils represented by profile 53-Grade (IV):Poor soils include profiles 2,3,4,6 andWhile the studied soil profiles of wadi Qen are placed between (III) and (VI)grades as follow:1-Grade (III):Fair soils include profile no.122-Grade (IV):Poor soils represented by profiles No.8, 0, and 15 3-Grade (V):Very poor soils include profiles No.9,11,13,and 144-Grade (VI):Non agricultural soils represented by pr file No.16 and 17