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GEOMORPHOLOGICAL CHANGES AT THE AREA OF PYRGOS (WEST PELOPONNESE, GREECE) DURING THE EARTHQUAKE OF THE 26th MARCH 1993

LEKKAS, E., FOUNTOULIS, I. & MIGIROS, G.

The western part of Peloponnese and especially the area around the city of Pyrgos is characterized by the presence of an active stress field due to convergence between the European and African plates. The earthquake of the 26^{th} March 1993 (Ms=5.2 R) and the following seismic activity affected the thick Quaternary deposits, which fill the tectonic graben of Pyrgos. They caused extensive geomorphological changes, which are listed below.

- Landslides Rock falls. There were observed 10 large falls sandstone blocks (100-100.000m³). the falls were situated along Vounargos Katakolo "geomorphological discontinuity". The geomorphological discontinuity coincides with a fault zone, which gave small earthquakes. Note that along other geomorphological discontinuities, which do not coincide with major fault zones there were no falls observed.
- Seismic Fractures. They were observed in the Pyrgos built up area and can be connected with known active faults. Their length is a few meters and their width is up to a few centimeters.
- Subsidence. It was observed along the Katakolo Zacharo coastal zone, near the delt of Pinios River, and extended over an area of 2km². maximum subsidence was at the order of a few tens of centimeters. The main reason of the subsidence is thought to be the loose unconsolidated soil formations.
- Liquefaction phenomena. It was observed along the Katakolo Zacharo coastal zone, 3km away from Alfios River. The liquefied formations underlie the superficial deposits and distributed them extensively. The liquefied formations were ejected upwards and, in a few sites formed small mounts.

All the geomorphological changes described here, have affected the topography and are going to play a key role in the long term urban planning of the region.

v6-1 ACTIVE DEFORMATION AND TOPOGRAPHY

ILLER) - REMARKANDA OF A POTENTIAL EARTHQUANE SOciO IL THE POLUNG AREA (SOUTHERN ITALYE BAST) - JA - OGLE AND GEOMORPHIC OBSERVATIONS OF FRICEME I I d'Addevic GI Paedusie D. Meghra Ja

P019 Nazionale d. Geolisica, Via d. Vigna Monto, 602, 61, 45

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Polatini area (southern haly) is located along the main stalian-insigence zone out here ito large or moderate magnitud-in brackes are recorded since 1000 A.D. suggesting (ration responds to a setsmic gap. The presence of two active lag(ts) recently pointed out in the area, the Castowillan Earth (CF) incently pointed out in the area, the Castowillan Earth (CF) The Pollow Fault (PE). Since an important concern for the sino-hazard evaluation of the region is the identification and city territation of the potential earthquiste source incomentation and the matter territation that the CF and PE is table on the CF and PE is table a consideration of the fact that for their geometry and remarks the two subctares cannot be seismically active as the are time. The study of the landscape, in particular of young arrives (i.e. fault scarps, stream bods allovial fan and terraces if their interaction with the pre-existing morphology can be used solve this question. For this reason, we recently started acoud Linex and geological surveys, and microtopographic mapping ong the CF, in addition to trenching invisugation

ar preliminar results show that occent movements along the PL are mainly localized west of the action with the CF,

the major topographic features of the area are mainly related to . .ong-term activity along the PI-,

ong-term activity along the PY, the CF do not show significant topographic contrasti-genoing that the beginning of its activity is very rocent, trenching and detailed geomorphic study at regional walr alleare evidence of repeated surface faulting events along the Cl.

(7P)1 (27) TIVE THRUST-RELATED FOLD AND STRUCTURAL "DIBLING THE LEASNAM EXAMPLE Veghraoul, M., Marcier, F., Frizon de Lamotie. D

inpt Geologia URA 1369 Univ Corgy-Pontoise 95033 France

inventional models of thrust-related folds applied to the Sara EL Marouf (SEM) active fold near El Asnem, suggest a shellow Prollement at about 4 km. This contrasts with the 12 km rupture inplit inferred from the sessmic sequence of the 1980 carthquake. Ms-7.3). Detailed geological and geomorphological investigations onblined with data analysis of the aftershock distribution at depth

uside a basis for understanding such structures. The high-angle surve fault appears to be an old major normal fault that controls the Muscene and Phocene deposits of the Chébif basin. The setsmogene Silicene and process during so the Chefrid data. The destroyens, a Assam reverse fault is then an inverted from a structure associated is in a regional progra-back sequence. On the other hand, the SFM riduited can be considered as built up above a shallow décollement which is likely a branch of the Techera blind thrust (see figure techw). Thus, early stages (lower Quaternary) of the SEM fold to built an end of the techera blind thrust (see figure). Evelopment are related to a ramp propagation from the Shellow Evelopment are related to a ramp propagation from the shallow Evolution and fault, is early stages (early Pleistocene) did not result from everse movements along this fault During the late stages the 12 km lepht décollement propagates to the old normal fault which act as a treakthrough reaching the surface during past large exchanakes. The hidding process and its geomorphic signature are documented and we incuss the proposed kinematic model with similar examples of -smogenic faults and related folds



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(AP)
(AFLUENCE OF FIEALE VOLCAND ON THE DEFORMATION DF (HE ASAL RIFT (DJIBOUTI)
(de Chaballer, J.B.*, Avouac J.P.* Ruegg. J.C.**

caboratoire de Geophysique B P 12, 91680 Bruyeres le Châtet

rance Institut de Physique du Globe, Pans, France

lonsidering the low rate of erosion and vedimentation in Afar, the Substocring the low rate of erosion and scanmentation in extar, one high resolution digital elevation model of Asial rift furnish an "sphortoutily to understand the meetianics of niting Geology and morphology of the Asial rift reveals that the topography has resulted from the dismemberment over the last 100,000 yr of the Fieale vincanic edifice

Three dimensional deformation of this vulcano has been quantified from the restoration of the former geometry Faultung and dykes injection has accomodated 2550m of extension and 350 m of subsidence. Moreover, it indicates heterogeneous deformation, with localisation of the extension at rift axis. This heterogeneity is also usible on the fracturation field

(1) the faults are curved toward nft axis around Ficate crater

(2) en echelon normal faults indicate enher lefi laterat and right tateral shear zones oblique to the rift axis around Ficale crater These shear zones as well as tendency of faults to concentrate at nft acts near the Fiende crater suggest that the heterogeneous

distribution of strain is due to the presence of the volcano Numerical mechanical simulations allow to explore the possibility that this heterogeneity is due to the topographic loading of the

solution or to the presence of a may notes choosen. The topographic loading increase the max num shear stress above the coloring of suggest activation of faults at of activ. Vertical strain R₂₀ (derived from the modeling is more intense above the volumin and is consistent and the reserves distant stresses above the strain R $_{12}$ derived from the modeling is the modeline address and ann and is consistent with the vertical displacement on faults recorded by the topopraphy. However, the displacement on faults principal sures, injut which could be considered as the fault strike or extensional stress field is not modelied by the topography. The effect of magmatic fraction completed as a hole in a classic and use combined with the second extensional stress field research that the direct on strends provides stress of its consistent with the observed or system of Faulty

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REPORT OF A DAME A DAME AND A DESCRIPTION A DESCRIPO

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The western part of Feloporarese and especially the area around the may of Paryon is characterised by the presence of an active stress lie found to the convergence between the European and stimon plates. The earthquake of the 20th March 1990 (Ms=5.2 R) and the losowing session activity affected the thick Quaternary orposits which the fectoric graden of Pyrgos. They caused extensive geomorphological changes, which are listed below

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VET (10P) MPACT OF THRUST TYPE TECTONIC ACTIVITY ON THE 1 VOLVTION OF THE GEOMORPHOLOGY OF INAHOS VALLEY W GREECED

Paviopoulos, A.C., Parchaudis, I.A.

Lab of Mineralogy-Geology Agricultural University of Athens

The Inahos valley is situated between the calcureous Valios (Gavrovo) mountain to the east and the flyschic Makrynoros mountain to the west, in Akamania district (W. Greece). The valley trends in its greater part, parallel to the thrust front, formed by the Valtos mountain overthrusted on the Makrymoros flyach sequences in fact, the valley was opened initially, along the axis of Epirus-Akamania synchrie which is formed in the eastern part of the Jonuan zone in Greece

In order to examine the relations between the actual geomorphological situation and the tectonic activity of the region we studied the evolution in time and space of the fluvial terraces developed in both sides of the valley. For a better understanding and mapping of the particular features of the terraces we used senal photo stereo pairs, topographic maps 1.50,000 and GIS fucilities. From the aerial photos we mapped the tectoric features of the studied area while from the topographic maps we created the digital elevation model (DEM) and the slope steepness map By combining these data through a GIS we observed that the fluvial terraces are drifting from the east towards the west, forming chils to the western banks, developed on the flysch formations The active tectonics of the region is prooved closely related to the thrust of Valtos mountains. The whole mechanism of the geomorphological evolution is thus controled by the advancing illusing and the consequent sugration of Inahos valley to the west. In the same time the relations between, the valley axis and the synchine of Akurnania becomes more obscure.

VE1 (11P) EARTHQUAKES AND COASTAL MORPHOGENESIS IN CENTRALEUBOEA Skirgs.S.*, Pirazzoh P.A.**

1 G M E , Athens TCNRS_URA 141 Meudon

A flight of benches, more than one hundred and fifty moter high is observed along East Coast of Central Euboea Island, central Acgean See These bonches have no manne sedimental cover but are mostly

Instrumental to the control of the second state with the term uplifies tructure. Presence of the control of the second state o

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ACTIVE LESTODE Τı 151.5 Dorași I. Eslevez, A.1, Altain

Орю Сексе на сталу Маетта и Славана. ПОро Панер Баледа на дала стала стала раз 0.51

The now Segma Park in some risk in a science 1.5 area of Spain, in the method tension of the time of Albania (2016) constituting the difference of a science transmission of the science (2016) basis of the science o most of the defair national feature: opurated in the inspigment materials as folds and diverse builds which partially control the present topography. After this compressive, chase a new episolitic moderate in activity, takes, place so that the quateriary sedmems filling the basin and will the continuinal steel thrus show some deformational features, studies canned soll or some aspect in a active tectorics as addiminations. To internation were deposits geomotionage most exist in the tax of instance subject in the most recent field of the basin and the tax of instance subject quarties the How mere should be failed instance subject in geochronology methods confirm this solver. The obstack of in-geochronology methods confirm this solver the details for one activity. activity

As far as spismicity is menumed in invenious of thouses 4.20 As far as solonicity is the entried in operating with quarker of an before recorded during the rest entries of a pariodit in the optical of them showing a magnitude reaction of a pariodit in the optical of them reveals that a variabilitize event of recording the poly of second magnitude) reused great damage in the a scient data. The second activity is related mainten the for manifold and second activities of which in this and spans up to a the average of the Crimitian. Which in this one spans up to a time whow here intercontentioner Fault System in the motionership of the take last the ow Segula System in its southern borde. There exist another transversal NW SE system called San Migue to Salmas Fuel System genetically associated to the precisitient which salwa considered to be respersintle to the subsmooty of the area

Although data on tools mechanisms and depth, distribution or Anthough data the function mechanisms and depth distribution of hypocenters as well as recent deformational records observed at surface are rather scarse, the analysis of all this information is consistent with a compressive situation in the Low Segura Basiv, with a NNV-SSF to N 5 main structuring and an associated E W extension in this geodynamic solting, the deep NE-SW to ENF WSW Fault Systems work as normal or reverse faults while singlish strike stip, while the NW SE Fault System behave as dexiral stip.

This work has been supported by the CIIC YT. Project AMB92 0531

VI-1 213P1 THE RECENT VERTICAL MOVEMENTS AND CERTAIN CHARACTERISTIC FLATURES OF THE FARTH CHUST FOR THE AREA OF WEST-HUNGARY-REGRESSION ANALYSIS Joo, I, Modool ()

College for Surveying and County Planning of the University of Forestry and Timber Industry Szekesleheivar Hungary

In the area of Hungary using the data of repeated precise geodetic measurements we have some reliable information about the tendencies of recent vertical movements. As a result of the correlation analysis made lew years ago we have found the area of West Hungary the best appropriate region for the application of multiple linear modelling technique in the investigation of receni vertical inovenients. This area is the end of the Eastern Alps which is bordered by the Raba tectonical line. On the basis of the results of this investigation and geological data (basement depth, gravity anomaly, terrestrial hear flow seismicity) a presumed connection has been investigated by using regression analysis. A linear function with four variables will be presented in our paper as a model of the investigated pitenomena, including the model fitting

(14P)

SPACE-TIME MIGRATION OF STRESSED-DEFORMING PROCESSES IN THE EARTH'S CRUST (WITHIN CAUCASUS) Kasianova, N.A.

Moskow State University

The analysis of geodesic measures durabusing a profession of the second structure of the second struct of oil gas velus on Terrsko Sunjenskaja nil gas zow alloved to reveal some features of modern stressed defitioned state of 11-1 Eart's crost diversoularly, the migration of diance? waves of swightlesson activity has been established as a result of tub of the 1.50 but on course of warthquares separately on Fores in monitorball and lagitudina' directions. \mathcal{P} have power from the south to the North, its velocity in writous structure coord ranges 2.7. km/year. S wave moves from the