surface on the continent and bottom relief in the surrounding seas, (iii) magnetic and gravity anomalies, (iv) seismic evidence (single DSS lines on land, extensive MCS coverage offshore), (v) meager drill data on the shelf. Some of these datasets are available as digital grids and/or images developed under international projects and released to public domain (e.g. bedrock and seabed topography from BEDMAP project, magnetic anomalies from ADMAP project, offshore seismic lines from SDLS project), whereas the condensed summaries of crucial geologic and geochemical evidence still remain largely the intellectual property of the researches directly involved in cartographic generalizations.Significant growth of this overall database by the turn of the 21st century not only enabled the upgrading of earlier maps imaging the Antarctic land, but also made it possible to include in compilations the Antarctic shelf and large portion of the adjacent deep seabed. New insights into Antarctic tectonic history prior and subsequent to Gondwana breakup that emerged from data analysis and re-interpretation constituted the basis for developing a comprehensive legend for innovative Tectonic Map of the Antarctic which is currently being constructed at VNIIOkeangeologia in St. Petersburg, Russia. The compilation demonstrates a steady progress and has approached the stage when it can be recognized as a formal CGMW project with identifiable timeframe.

165-10 Oral Collard, Christophe

GIS MODELLING AND MAP PRODUCTION AT CONTINENT SCALE EXEMPLIFIED BY THE ASSEMBLAGE AND HARMONIZATION OF FOUR MAIN REGIONS WITHIN THE TECTONIC MAP OF AFRICA

COLLARD Christophe[1], DE MAEYER Philippe[1]
1 - Geography Department - University Ghent - Belgium

Keywords: GIS modelling; cartography; tectonic mapping; Africa

The realisation of the second edition of the tectonic map of Africa on a scale of 1 : 5 000 000 is a project managed by the Commission for the Geological Map of the World (CGMW) and leadered by G. de Kock, for the Southern part of the Equator, and J. Sougy for the Northern part. This last part is itself divided in three parts: 0°-16°N, 16°N-40°N and the Middle East. The original overall objective of this transnational project was to produce a printed paper map, but developing a consistent Geographical Information System (GIS) to collect, store and maintain the relevant data became an equally important goal. This digital approach resulted in new problems and challenges, unknown to the classical (analogue) methods of map production. Amongst others we mention the challenge of building a complete but compact data structure or the problems associated with adding data originating from different projections, scales or file formats. Next to the classical necessary skills in geology/tectonics (content of the map) and cartography (map design and aesthetics), advanced knowledge in (geo-) information technology and (geo-) databases is indispensable. This lecture will not focus on the tectonic content of the map, but on the new problems and challenges mentioned above. The developed GIS model and geodatabase containing the tectonic data will be presented and explained, followed by the cartographic methods to produce the paper map from this digital data.

165-11 Oral Segalovich, Valentin

GRAVITY AND MAGNETIC TOMOGRAPHY OF THE EARTH

SEGALOVICH Valentin[1], VASIL'EV Oleg[1], SHUMILOV Andrey[1]
1 - Departament of natural resources Scientific Industrial Centre "Nedra"

Keywords: gravity; magnetic; tomography; 3D modeling; tectonics

The interpretation of geophysical data is in connection with the problem of many-valuedness. The primary way for solution is the integration of data. To do this an appropriate new technology of gravity and magnetic tomography (GMT) was developed.This technique is meant to solve 3D problems of gravimetry and magne-tomenry. The accepted condition for the problem is a maximum utiliza-tion of supplementary information.The principal distinctions from other existing techniques are:* Tomography principles: presentation by thin sections, the multibeam (105-106) surveying of the Earth by G and Ta lines of force, etc.;* Unlimited inclusion of topographic, geological and other data;* Continuous filling of the medium by arbitrary, nonself-intersecting polyhedrons with polynomially distributed density and free-oriented magnetization;The WinMagnet software package has been developed. The following algorithms have been realized:* The algorithm of analytical solution of direct problem of gravimetry and magnetomenry for the polyhedrons indicated above [Kravtsov, 1978; 1993];* The algorithm of calculation of linear variables characterizing poly-nomial density ant vector of magnetization of geological structures by means of solution of large (105-106) systems of linear equations taking into account the restrictions [Kravtsov, 1995]; * The algorithm of section surfaces triangulation;* The algorithm of 3D modeling technology (calculation, construction and visualization of cross-sections of polyhedrons, computation of density and magnetization, etc.);* The algorithm of visual and automatic editing of three-dimensional models;* The algorithm of interactive search of local minimum of errors as a function of discrete variation of nonlinear parameters at fixed values of linear variables.The GMT allows studying the structure of sedimentary basins, fold belts, crystalline massifs, ore zones, oil and gas fields and separate de-posit occurrences. The structures different in small values of magnetiza-tion or anomalous density are taken into consideration and being stud-ied. With the help of GMT technique old data can be efficiently reinter-preted, the problems of regional tectonics can be newly solved and even the density and magnetic global model of the Earth can be newly inter-preted.This technique was approved on objects of deep and superdeep drilling and while searching the kimberlite pipes. The obtained results are pre-sented as illustrated examples on Fig. 1-6.

165-12 Oral Koji, Wakita

INTERACTIVE GEOLOGICAL HAZARD MAPS OF EAST AND SOUTHEAST ASIA USING GEOHAZARDVIEW

KOJI Wakita[1], HIROKAZU Kato[2], JOEL Bandibas[1]
1 - Geological Survey of Japan, AIST
2 - AIST, Tohoku

Keywords: GEOLOGICAL HAZARD; GEOHAZARDVIEW; HAZARD MAP; GIS; ASIA

An interactive geological hazard map of East and Southeast Asia was developed at the Geological Survey of Japan(GSJ). Geological hazard maps and related information are presented in an interactive way using the GIS software developed at GSJ. The main purpose of the software is to readily provide information about geological hazards to a wide range of users. The software provides a good alternative to viewing geological hazard maps and related information in paper format. It incorporates spatial and a-spatial data to interactively present the time, locations, and areas covered by geological hazards and related information. Queries for a particular hazard information like number of casualties, magnitude and location of earthquake epicenters, names and locations of volcanoes erupted in a particular year can be easily made. Simulations of the occurrence of a particular geological event like the spread of volcanic ash during major volcanic eruptions also can be easily shown. The new software is named GeoHazardView.

165-13 Poster Korhonen, Juha Ville

WORLD DIGITAL MAGNETIC ANOMALY MAP

KORHONEN Juha Ville[1], REEVES Colin[2], GHIDELLA Marta[3], MAUS Stefan[4], MCLEAN Susan[5], RAVAT Dhananjay[6]
1 - Geological Survey of Finland
2 - ITC
3 - Instituto Antartico Argentino
4 - GeoForschungsZentrum Potsdam
5 - NOAA E/GC1
6 - Southern Illinois University C'dale

Keywords: geophysical maps; magnetic anomalies; lithosphere; global; international cooperation

At Canberra 1979 and Boulder 1995, IUGG/IAGA presented resolutions to compile national magnetic anomaly maps 1:2.5 million for further compilation of maps of the continents and finally making the anomaly map of the World plus releasing the data base. Working group for Magnetic Anomalies, Land and Sea (lately WG V9) supervised the task until IUGG/IAGA at Sapporo 2003, where a Task Force was established to continue the work.The global magnetic anomaly map aims to display such component of the magnetic field that is caused by the ferrimagnetic uppermost part of the Lithosphere. The map will be smoothed as if the component were observed at an altitude of a few km above the Earth's surface. It will be suitable to study overall crustal structure, make regional and global crustal models, and serve as background information for more detailed geological and geophysical studies. The map will be based mainly on airborne and seaborne magnetic surveys. Satellite magnetic data will be used for such parts where near ground information is poor or missing. Ground measurements will be used from magnetic observatories and areas where extensive ground surveys provide principal regional coverage. At the moment open questions still remain to be solved, including anomaly calculation schemes and rights of data access and database distribution. The TF plans to arrange a scientific session of magnetic anomaly compilation and show a tentative global anomaly map in the next IAGA meeting in Toulouse 2005. Further, the first edition of the map would be published and the database released in IUGG meeting in Perugia 2007.

165-14 Poster Trofimov, Victor Titovich

THE MAP OF THE ENGINEERING GEOLOGICAL STRUCTURES OF THE EARTH

TROFIMOV Victor Titovich[1], AVERKINA Tatiana Ivanovna[1]
1 - Lomonosov Moscow State University

Keywords: map; Earth; engineering geological structures

Engineering geology studies geological peculiarities of the Earth's crust for the purposes of construction and engineering activities. Engineering geological structures are the largest objects of investigation of this geological science. We recall that engineering geological structures are referred to as regularly constructed volumes (sections) of the geological space, with are formed under the action of the certain regional and zonal factors and are homogeneous with respect to some engineering geological parameters. Varying the combinations of the regional and zonal factors (and, consequently, corresponding engineering geological parameters) and proceeding from the general to the particular, we may distinguish the engineering geological structures of the various hierarchic levels: superstructures, megastructures, macrostructures, and mesostructures. Engineering geological superstructure is the largest unit. They are homogeneous with respect to engineering geological parameters defined by the deep structure of the Earth's crust and water-air conditions of the surface environment. Example: continental subaerial and continental subaquatic superstructures.Engineering geological megastructures represents a section of superstructure with uniform recent megarelief and phase state of water in rock. Examples of the megastructures: platform with frozen rocks, orogen with thawed rocks and so on.Engineering geological macrostructure is a section of megastructure with similar age of formation of the neotectonic structures and uniform distribution of various rocks. For example, platform with thawed rocks may be divided into the young structures with highly moistened rocks, those with slightly moistened rocks and so on.Engineering geological mesostructure is referred to as a section of macrostructure with anhomogeneous structure of the upper section, including presence (or absence) of seasonally frozen or thawed rocks. Examples of the mesostructures: shields with seasonal frozen rocks, depressions with thawing rocks and so on.The systematization of the complete factual diversity of the engineering geological structures of the Earth was worked out, which includes 4 superstructures, 25 megastructures, 75 macrostructures, and 267 mesostructures. The systematization have been utilized to compose a map of the types of engineering geological structures of the Earth on a scale 1: 35000000.

165-15 Poster Fantozzi, Pier Lorenzo

A GEODATABASE FOR THE EARTH SCIENCES; E NEW VERSION OF THE STRUCTURAL MODEL OF ITALY

SCANDONE Paolo[1], PATACCA Etta[1], ANTOMPAOLI Maria Luisa[2], CARMIGNANI Luigi[2], CASTAGNINI Giulio[2], PIRRO Altair[2], FANTOZZI Pier Lorenzo[2], FERRI Stefano[2], GIANNETTI Laila[2], GRAZIOSI Barbara[2], et al.
1 - DEPARTMENT OF EARTH SCIENCES UNIVERSITY OF PISA - ITALY
2 - DEPARTMENT OF EARTH SCIENCES CENTER OF GEOTECHNOLOGY UNIVERSITY OF SIENA -ITALY

Keywords: STRUCTURAL MODEL; APENNINES; ALPS; GIS; DATA BASE

The advent of GIS represent a revolution in the management of cartography; this system allows to produce from a georeferencied archive, plots of map at different scale, spatial analysis, map algebra computations, and any type of integrations between DTM and geophysical data. The target of this work consist of the realization of a geographical database to support the modeling of a structural model of Italy, through the integration of geological mapping data and any other type of geoscience data (biostratigraphical, geophysical, etc.). The starting point of the project will be the Structural Model of Italy, published by CNR in 1985, a very detailed geo-structural map of Italy composed by 6 sheets at the scale 1:500.000. The translation of this map in digital form in a GIS-DBMS structure, will allows the availability, for the first time in Italy, of a complete geological database for the whole italian area. This database will supply a scientific and technical guide for in-progress activity of the survey of the new geological map of Italy at the scale 1:50.000 (CARG Project), and for the 3D reconstruction of the main tectonic structures.All the above described potentiality and functions will be ensured by the use of a new digital version of topographic map of europe at the scale 1:1000.000 (Europe Global Map). This map, realized by the contribute of Istituto Geografico Militare (i.e. Italian Army) according to the EU standards, present in digital (DBMS) forms updated data on elevations, road network, drainage network and main infrastructures, all them organized according a true topography database.The geodatabase here presented includes:- The old versione of CNR Structural Model of Italy in an

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accurate reproduction on a newdigital map. A logic hierarchization of the represented geological objectswill allow the automatic representation of homogeneous groups of units thatoccupy the same position in the hierarchic tree;-A seledted updated "windows" on areas characterised by different structural features(e.g. Alps, Apennines, Sardinia) with the optional display, by simplequeries, of the geological/geophysical data bank (well logs, seismicreflection lines etc.).

165-16 Poster Chikán, Géza

NEW MAP OF MECSEK MOUNTAINS (HUNGARY)

CHIKÁN Géza[1], KÓKAI András[1]
1 - Geological Institute of Hungary

Keywords: Geological mapping; formations; Mesozoic; Miocene; stratigraphy

On the Southern part of Hungary we have an interesting hilly area: Mecsek Mts. The highest point of Mecsek is 682 m.The Mecsek is a folded and broken mountain. The oldest rocks on the surface are more than 300 M year old, and Quaternary sediments cover it with different thickness. The geological section of mountain is beginning with Paleozoic granite (Mórágy Complex). The age of the Complex is 330 to 350 Ma. The oldest sedimentary rocks are Permian sandstones with some rhyolite subvolcanic rocks (Korpád, Cserdi, Boda and Gyűrűfű Formation; maximal thickness of this formations is 2800 m). The Mesozoic sequence is consisting sandstones, limestone, dolomite and other sedimentary rocks with some coal-bearing strata in the Jurassic. Mesozoic sediments have about 5000 m thickness. On the end of the Mesozoic were deposited Cretaceous sediments. They consist of mostly worked up volcanic rocks, partly different limestone and marl (Márévár, Hidasivölgy, Magyaregregy, Apátvarasd Formations). A special deep marine basin facies represents the Upper Cretaceous Vékény Formation.After the Cretaceous follows a long terrestrial period without sediments: the next formations were deposited in Miocene. This period begins with variegated terrestrial (fluvial) conglomerate, sandstone and siltstone (Szászvár Formation, about 700 m thick), and after it begins a new transgression with some volcanic events (Budafa Formation, mainly sandstone, 700 m, Gyulakeszi Formation, rhyolite tuff, 30-100 m, Tar Formation, dacite tuff, 15-50 m, Mecsek Andesite Formation, about 300 m). The marine sediments of Miocene are schlier (Tekeres Formation), limestone (Pécsszabolcs Formation), clay marl (Szilágy Formation), paralic-brackish lignite (Hidas Formation), brackish-shoreline limestone (Tinnye Formation) and marl (Kozárd Formation, Csákvár Formation). Thickness of marine Miocene sediments is maximum 800 m. The closing sediments of Miocene are Kálla and Somló Formations ("Pannonian beds"), marginal sand, sandstone and fine-grained, well-rounded gravel. They have together about 150 m thickness.In the Quaternary were deposited 5-100 m thick sediments in different way. Most frequent and thick is loess (it could be 70 m thick) and different type of slope-sediments.Our new map is on a 1:50 000 scale. It shows a semi-surface situation: on the higher part of mountain are drawn those formations, which have significant thickness.

165-17 Poster Basagic, Mirza

GEOLOGICAL MAP OF THE BOSNIA AND HERZEGOVINA, SC 1: 300.000, CONTENT AND APPLICATION POSSYBILITIES

CICIC Safet[1], BASAGIC Mirza[1]
1 - Civil Engineering Faculty - Geology Institute

Keywords: Geological mapping; synthesis; Silurian to Quaternary age; further researches; sustainable development and studies of Bosnia and Herzegovina

Geological map of the Bosnia and Herzegovina, Sc 1: 300.000 was completed and printed in the middle of 2003. The author of the Map is Ph. D. Sc. Safet Cicic.The Map is successful synthesis of previous works on geological cartography of this part of the Dinarides, performed from 1840. to 1990.The terrain of the B&H consists of the different magmatic, metamorphic and sediment rocks from Silurian to Quaternary age. They were exposed very complicated geological evolution during 400 millions years with traces of the Herzynian and Alpine orogenic cycles.The Map shows, according to contemporary standards, litho-facial composition and tectonic structure of Bosnia and Herzegovina. The territory shown in this map covers the area of 51.129 km2, belongs to the south branch of the Alpides and represents very interesting part of the Alpine orogen. Due to that, this map has scientific and practical importance for explorers in this and other orogen zones all around the world.Geological Map of the Bosnia and Herzegovina 1: 300.000 is paper of the importance of the first class for further research of Bosnia and Herzegovina and the Dinarides terrains in entirety. It is of great importance for elaboration of programs and projects of fundamental and regional researches, environmental planning, sustainable development and ecological studies, as well as in the sphere of mining, civil engineering, agriculture, water resources management, traffic, forestry and other parts of activities related to lithosphere and knowledge of its resources.

165-18 Poster Kumelj, Špela

METHODOLOGY OF DIGITAL GEOLOGICAL MAP OF KOZJANSKO (SLOVENIA) IN SCALE 1:50.000

KUMELJ Špela[1]
1 - Geological Survey of Slovenija

Keywords: geology; geological information system; Kozjansko region; Slovenia; methodology

After the 25 years of geological research and detailed field reconnaissance, the area of Kozjansko region, which spreads over 400 km2, was detailed geologically mapped in scale 1:10.000. In March 2004, Geological Survey of Slovenia published and printed the Geological map of Kozjansko in scale 1:50.000. Introduction to GIS environment was organised in AutoCAD program package (multi-layer approach). Through building up topology, we processed control of the gathered data and organised and stored them in standard format for their distribution (*.e00 format). Cartography was established in ArcGIS program package (*.mxd format), where we set colour of lithostratigraphic units, colour, type and thickness of line, point and annotation elements and topography (all the legends have been saved in *.lyr format).In the article, the methodology of capturing, organising and presenting digital geological data are presented in order to emphasise its preferences and deficiencies. What did we do well, what could be done better, where we went wrong and what we've learned from it. Parallel to the Kozjansko map production, the procedure of digital cartography in Slovene Geological Information System was standardised.

165-19 Poster Galetskiy, Leonid

COMPLEX METALLOGENIC MAP OF UKRAINE (SCALE 1:500000)

GALETSKIY Leonid[1], VOYNOVSKIY Anatoliy[2], GURSKIY Dmitriy[2]
1 - Institute of Geological Sciences of NAS of Ukraine
2 - State Geological Survey of Ukraine

Keywords: Ukraine; metallogeny; mineral-resource potential

A new metallogenic map of Ukraine was published. It represents a geological structures and ore content. Its main geostructures are the Ukrainian shield, Volyn'-Podillia plate, Dnipro-Donets'k depression, Carpathians and Crimea fold mountains.Geology and metallogeny in this region are shown as a new methodological concept of multifactor model of lithosphere development (self-regulating system with synergetic nature).Metallogeny of geological regions is determine of geoblocks evolution, sutural zones, transgeoblocks mobile activation with through and postorogenic nature.The main geological and ore formations are separated and united in a system of structural - material complexes. The territory of Ukraine is introduced variety of geological and ore formations from early Archean (3,7 billion years) to Anthropogen.A structural and metallogenic zoning and prognosis estimation on black, non-ferrous, rare and noble metals, non-metallic raw are realized within this region. More than 8 thousand deposits 90 types of mineral resources are explored within the territory of Ukraine. Also more than 20 thousand show of ore is detected. The area of Ukraine is 603,7 km2 (0,4 % of a land).Ukraine can provide about 5 % of global balance of mineral resources including 20 % manganese and 10 % of iron ores, 5 % of clays and kaolin, 3 % coals. Ukraine has large resources of oil and gas, uranium ores, titanium, zircon, graphite, sodium and potassium salts, not ore raw for metallurgy, building rocks, mineral waters. The industrial deposits of rare and noble metals, apatites, fluorite are detected per the last years. The outlooks of a determination of fields of The prospects of finding of new types of mineral resources: coppers and nickel, molybdenum, vanadium, platinoids are installed.Thus, Ukraine is largest metallogenic provinces of the world and has a powerful mineral-resource potential.

165-20 Poster Campa-Uranga, Maria Fernanda

THE TECTONOSTRATIGRAPHIC TERRANE MAP OF SOUTHERN NORTH AMERICA

CAMPA-URANGA Maria Fernanda[1]
1 - Universidad Autonoma de Guerrero

Keywords: Map; Terranes; North America; Mexico; Tectonics

The southern part of the North American continent is made up of several major terranes maped 20 years ago in a new map which provided a different vision of the tectonic evolution model of Mexico (Campa and Coney, 1983).During the last 2 decades, geological discoveries and new conceptual interpretations has resulted in a new map and tectonic evolution of the southern terranes of North America, which has an inherent complexity not shared by most features mingle of the Cordillera, Central Craton and Appalachian belts (Campa 1997, 2004).The central border MEX-USA terranes are essentially or principally the original: Chihuahua, Caborca and Cortes, which are blocks of the disrupted Laurentia craton.The eastern terranes: Ouachita, Marathon, Coahuila, Sierra Madre Oriental, Maya, Mixteca and Oaxaca are also disrupted and moved. The Grenvillian and Appalachian blocks modified the map after recent discoveries of a new Grenvillian ages in Mixteca, Mixtequita and Chiapas plutons (Campa 2000, 2001, 2003).The western Guerrero terrane is composite of several volcanic island arcs with geochemical signature diverse associated with plattform Cretaceous deposits, including Taxco and Taxco Viejo blocks (Campa, 2003).Ten years ago it was published an intent of modified map of terranes of Mexico, but it was principally the same original map only with different names (Sedlock, 1993). This publication failed and aggregate more confusion. I propose a different conceptual interpretation of the terrane maps in the paleogeography of the southern North America or mexican territory prior to 1846.

165-21 Poster Zappettini, Eduardo Osvaldo

THE METALLOGENIC MAP OF SOUTH AMERICA IN THE WEB

ZAPPETTINI Eduardo Osvaldo[1], GAREA German[1], FERPOZZI Federico[1]
1 - Servicio Geológico Minero Argentino

Keywords: Metallogeny; South America; GIS; WEB; Geosemantica

The Metallogenic Map of South America at 1:5,000,000 scale, produced under the coordination of the Geological and Mining Survey of Argentina (SEGEMAR), is displayed in the official WEB of SEGEMAR (www.segemar.gov.ar).The data are supported in a Web Mapping Service, the MapServer freeware, using the infrastructure developed under GeoSemantica project (www.node.geosemantica.net). GeoSemantica is an ontology based web services architecture, developed under the Multinational Andean Project (www.pma-map.com), designed for integrating, translating and sharing multivariant information and knowledge assets (geospatial and news media) in a distributed network environment.Geosemantica tools are employed in order to link the Web site with the Web Mapping Service (WMS) allowing to visualize the map with all the capabilities of the WMS.The presentation of metallogenic map in the Web site allows to navigate, zoom and pan, and also to select through different available layers in order to visualize specific thematic maps. The INFO tool display tabular information about map objects; one of the tabular information that appear clicking on deposit symbols is a link to mineral deposit reports created from the World Minerals Geoscience Database that has been utilized for handling the mineral deposit information of the project.Available layers are: geotectonic map, geological map, mineral deposits, structures, terranes, metallogenic belts. Mineral deposits can be selected using different linked properties like commodity, size, genetic/descriptive model.As far as possible colours, symbols and other grafic information has been preserved in the Web presentation of the map.GeoSemantica allows to create projects and to define its members, that can access the information and make modifications and updates. Using these GeoSemantica capabilities, the update of the map is expected to be made, creating a specific project for the Metallogenic Map, being the national coordinators, the members of the project allowed to make changes in all layers and associated databases.

165-22 Poster Asato, Carlos Gabriel

SPATIAL CONSTRAINTS, GENERALIZATION AND INTEGRATION OF DIGITAL MAPS IN LARGE AREAS SANTA CRUZ PROVINCE GEOLOGICAL MAP EXAMPLE

ASATO Carlos Gabriel[1]
1 - Servicio Geologico Minero Argentino

Keywords: GIS; CARTOGRAPHY; DATA INTEGRATION; MAP GENERALIZATION; GEOLOGICAL SURVEYS

People who work with digital map technology expect to handle data taken from different sheets as a continuous map or making larger maps from others with more detailed scales. Geographical data integration and map generalization involves a series of techniques and tasks where data, work procedures and people have to be specially prepared and coordinated, in order to obtain consistent maps. Hardware and software also have to be tuned in order to manage a huge amount of data, information digitized by different operators, and data taken from different sources.Since the construction of Santa Cruz province Geological Map (ARGENTINA) at 1:750.000 scale were made from the spatial integration and generalization of 27 geological sheets at 1:250.000, several