

**Romanian Academy  
Institute of Geodynamics  
"Sabba S.Ștefănescu"**

- 1. Name of the Institute:** Institute of Geodynamics „Sabba S.Ștefănescu” of the Romanian Academy
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- 4. Research fields:** Since its foundation, the Institute of Geodynamics "Sabba S. Ștefănescu" of the Romanian Academy focused its interest on fundamental research imposed by the tasks implied by the Priority Program of the Romanian Academy, "Complex geophysical research in geodynamically active areas, with a special emphasis on the Vrancea seismogenic area", such as:
  - the study of space-time variations of parameters causally linked to the accumulation of stresses responsible for earthquakes occurrence;
  - the study of natural internal (tectonic, seismic, landslides, etc.) and external (space weather and climate) hazards;
  - the monitoring of space-time variations of the gravitational, geomagnetic, geoelectric fields of the Earth, of the crust tilts and of the relative displacements of tectonic blocks on the Romanian territory;
  - modeling of the thermo-mechanical evolution of the lithosphere;
  - non-linear analysis of geodynamic systems;
  - studies of endogeneous processes in the geodynamic evolution of the Romanian territory;
  - study of heliosphere / geomagnetic field coupling;
  - construction of equipment designed for monitoring of geodynamic phenomena in observatories (tiltmeters, horizontal/vertical pendulums, extensometers, etc.) and in mobile laboratories for complex studies in geodynamically active areas (seismoactive areas, landslides, underground cavities collapses, areas that became geodynamically active because of anthropogenic activity)
  - study of long term evolution of terrestrial climate.
- 5. Human resources: researchers, PhD advisors, members:** 31 researchers, 25 PhD, 2 PhD advisors, 82 members
- 6. Young researchers forming, PhD students, post-docs, members:** 12 PhD students
- 7. Research facilities:** information point – over 12,600 periodics and 2,300 books; research equipment: desktop and laptop computers – over 40, sensors for geodynamics applications, data acquisition systems, geomagnetic, gravity and electromagnetic equipments, HPCC (High Performance Computer Cluster) with HPVC (High Performance Visualization Cluster) system, representing a computing center designed at the highest European standards, regarding both the used technology and the purpose

of the project, namely the research of seismogenic Vrancea area by means of advanced numerical algorithms.

At present, the Institute has a network of observatories and observation points, structured in profiles and geodynamics polygons, all having as a main purpose a better knowledge of phenomena leading to stress cumulating/earthquake triggering in geodynamically active areas, with a special concern for the geodynamically active area of the Romanian Carpathians bend - the Vrancea seismogenic zone. The network is concentrated in three geodynamics polygons: the Caldarusani-Tulnici Geodynamics Polygon, the Craciunesti-Deva, Sarmizegetusa Regia, Pades-Gorj Geodynamics Polygon and the Danube Delta - Mangalia Geodynamics Polygon.

## 8. Results obtained in research: papers published in the last 5 years:

### Books/Chapters in books

- Advances in Solar and Solar-Terrestrial Physics** (2012), Eds: **G. Maris & C. Demetrescu**, Published by Research Signpost, 2012; Rights Reserved Research Signpost, T.C. 37/661(2), Fort P.O., Trivandrum-695 023, Kerala, India, ISBN 978-81-308-0483-5
- Planeta Pământ – Planeta Vie** (2011), Zugrăvescu D., Munteanu F., Ed. Eagle, 250 p, ISBN 978-606-8315-29-4
- Integrated research on the intermediate depth earthquakes genesis within Vrancea zone**, Beșuțiu L. (2009), 253 p., Vergiliu Publishing House, ISBN 978-973-7600-59-2
- Studiul asupra influențelor gravimetrice induse de mările terestre în activitatea seismică din zona Vrancea** (2009), Cadicheanu, N., Ed. Universitară, București, 160 p., ISBN 978-973-749-575-4
- The Active Geodynamic Zone of Vrancea, Romania** (2005), Ed. Academiei Române, Eds.: Zugrăvescu D., Șuțeanu C., București, 2005, 184 p., ISBN 973-27-1084-5.
- Geodynamics: Outline of a Domain** (2004), Ed. Academiei Române, Eds.: Zugrăvescu D., Șuțeanu C., București, 2004, 174 p., ISBN 973-27-1095-0.
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- Ioane D., Diaconescu M., **Chitea F.**, Garbacea G.. *Active Fault systems and their significance for urban planning in Bucharest, Romania*. Earthquake Hazard Impact and Urban Planning, Environmental Hazards Series, **Springer**, pp 15- 43. DOI 10.1007/978-94-007-7981-5\_2. Online ISBN 978-94-007-7981-5. Print ISBN 978-94-007-7980-8, 2014.
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- Canon-Tapia, E., **Szakács A.**, eds. What is a Volcano? *Geological Society of America Special Paper 470*, ISBN 978-0-8137-2470-6 (pbk), 2010.
- Szakács A.**, Post-volcanic Phenomena in the East Carpathians. in Evelpidou, N.; Figueiredo, T. de; Mauro, F.; Tecim, V.; Vassilopoulos, A. (Eds.) "Natural Heritage from East to

West. Case studies from 6 EU Countries ". Springer Verlag, p.87-93, ISBN 978-3-642-01576-2, 2010.

## Papers

2014

- Cosma C., Cucuș (Dinu) A., Papp B., Begy R., Gabor A., Bican -Brișan N., **Besutiu L.**, Radon implications in life and Earth Science: Baita-Stei and Peceneaga-Camena Fault (Romania). *Carpathian Journal of Earth and Environmental Sciences*, 2014, 9, 2, 15 - 21, ISSN 1842 - 4090, on line ISSN 1844 - 489X, **FI = 0.727**
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- Kilpua, E.K.J., **Mierla, M.**, Zhukov, A.N., Rodriguez, L., Vourlidis, A., Wood, B., Solar Sources of Interplanetary Coronal Mass Ejections During the Solar Cycle 23/24 Minimum, *Solar Physics*, 289, 10, 3773-3797, 2014, **FI = 3.805**.
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## 2013

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## 2012

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## 9. National and international cooperations. Foreign guests that have visited the Institute:

### Foreign guests that have visited the Institute:

Prof.**Alina Donea**, Centre for Stellar and Planetary Astrophysics, Monash University, Clayton, Victoria, Australia

Dr.**Peter Pesec**, Director, Institute for Space Research of the Austrian Academy of Sciences

Dr.**Bernard Ducarme**, University of Liege, Belgium

Prof.**Katya Georgieva**, Solar-Terrestrial Influences Institute "Acad. Dimitar Mishev", cooperare România-Bulgaria, *High speed solar wind and its impact on geomagnetic activity*

Prof. **Alexandru Cristian Șuțeanu**, Saint Mary's Halifax University, New Scotland, Canada

Dr.**Haris Haralambous**, Frederick University, Nicosia, Cipru, proiect România-Cipru *Disturbed Ionospheric and Geomagnetoc Conditions under the Influence of Solar Activity*

Prof. **Martin Beniston**, Head of Geosciences Department of the Fribourg University, Switzerland

Prof. dr. **Mioara Manda**, Head of Observatories Department of the IPG-P (Institut de Physique du Globe Paris), **Dr. Mihai Roharik**, IPG-P (Institut de Physique du Globe Paris), France

Prof. **Jacques Zlotnicki**, Centre Nationale de la Recherche Scientifique - Clermont-Ferrand, France

Prof. **Bernard Bonin**, Université Paris-Sud, Département de Science de la Terre, Laboratoire IDES («Interactions et Dynamique des Environnements de Surface»), France

Prof. **Michael Ghil**, Head of Earth-Atmosphere-Ocean Department of the ENS (Ecole Normale Supérieure), France

Prof. **Lucian Ilie**, expert, VINCI-Paris Groupe, France

Dr. **Hans-Joachim Linthe**, Adolf Schmidt Observatory, German Research Centre for Geosciences, Helmholtz Centre Potsdam, Germany

Prof. **Ulrich Cubasch**, Dean, Climate Change Faculty, Free University, Berlin, Germany

Prof. **Vlad Manea**, professor at Universidad Nacional Autónoma de México, México

Dr. **Mariana Manea**, researcher at Universidad Nacional Autónoma de México, México

Dr. **Anatol Roman**, Institute of Geology and Geophysics Chişinău, Republic of Moldova

Acad. **Anatol Drumea**, Institute of Geology and Geophysics Chişinău, Republic of Moldova

Acad. **A.O.Gliko**, Dr. **Anna Kalinina**, Dr. **Vladimir Gheorghevici Budanov**, Dr. Olga Erteleva from the United Institute for Earth Physics of the Russian Academy of Sciences, Russia

Dr. **Mikhail Orlyuk**, Head of Geomagnetism Department and **Irina Makarenko** from the Physics Institute of the Academy of Sciences of Ukraine, Ukraine

Dr. **Richard Harrison**, de la U.S. Geological Survey, USA

Prof.dr. **Jan Kutina**, professor at the American University, Washington, Founding member of the World Organisation of Mineralogy, USA

Prof. **Mihai Ducea**, University of Arizona, USA

Prof. **Ilia I. Roussev**, Astronomic Institute, University of Hawaii, Honolulu, USA

Dr. **Elena Moise**, Astronomic Institute, University of Hawaii, Honolulu, USA

#### **National and international cooperations:**

##### **2014**

**Applied Research for sustainable development and economic growth following the principles of geoconservation: Supporting the Buzau Land UNESCO Geopark Initiative**, Proiectul **GeoSust**, tip parteneriat, contract 22 SEE/30.06.2014, Parteneri: Dr. Morten Clemetsen, Norges miljø og-biovitenskapelige universitet, Dr. Per Ingvor Haukeland, Telemarksforsking, Dr. Alexandru Andrasanu, Universitatea Bucuresti, Dr. Mihaela Melinte, Institutul Geocomar, Dr. Carmen Roba, Universitatea Babeş-Bolyai, Dr. Anamaria Iuga, Muzeul National al Taranului Roman

##### **2012**

**Studii integrate asupra edificiilor vulcanice post-colizionale de vârstă Miocen-Cuaternară din Carpații Orientali; constrângeri geologice și geofizice** (engl.: Integrated study of the post-collisional Miocene-Quaternary volcanic forms in the East Carpathians)

using geological and geophysical constraints InstEC)”, PN-II-ID-PCE-2012-4-0137, Director de proiect: Dr.Ioan Seghedi

#### 2011

**Câmpul geomagnetic sub foringul heliosferic. Determinarea structurii interne a Pământului și evaluarea hazardului geofizic produs de fenomene eruptive solare,** Contract 93/5.10.2011, Programul IDEI UEFISCDI, Director de proiect: Dr.Crișan Demetrescu, membru corespondent al Academiei Române

**Activitatea solară și geomagnetica și influențele lor asupra mediului terestru. Studiu de caz - climatul,** Program TE, Contract 21/5.10.2011, director de proiect: Dr.Venera Dobrică,

#### 2010

**Infrastructură cibernetică pentru studii geodinamice relaționate cu zona seismogenă Vrancea CYBERDYN,** Proiectul nr. ID 593, POS CCE (fonduri nerambursabile)

#### 2009

**Investigații geofizice complexe în regiunile active geodinamic din Carpații românești (zona seismogenă Vrancea) și Platforma Rusă,** Grant Academia Română, Director grant Dr.ing.Dorel Zugravescu, membru corespondent al Academiei Romane

**Studii electromagnetice privind stabilirea relațiilor interparametrice caracteristice alunecărilor de teren asociate evenimentelor seismice,** director de proiect: Dr. Dumitru Stanica, Contract Nr. nr.1028/19.01.2009

**Studiul migrării unor elemente în structurile acvifere din zona amplasamentului viitorului depozit final de deșeuri slab și mediu active Saligny (MIGRELEMENTS),** Partener proiect, director de proiect: Dr.Horia Mitrofan  
Parteneri: Institutul de Speologie "Emil Racoviță" al Academiei Române (coordonator), Universitatea București

#### 2008

Proiect SAFER « Services and Applications for Emergency Response » finanțat prin FP7 – Space, contract 218802/2008  
Coordonator: INFOTERRA France, over 50 parteners

**PN II – Sistem integrat avansat de monitorizare a precursorilor seismici, modelarea și evaluarea hazardului în zona Vrancea din date satelitare și geofizice in-situ (MAGEOS),** Partener proiect, director de proiect: Dr. Dumitru Stănică, Contract nr. 32-109/2008, Parteneriate, Contract 32-109/2008  
Parteneri: Optoelectronica (coordonator), Universitatea București, Institutul Național de Cercetare-Dezvoltare pentru Fizica Pământului

#### 2007

**Monitorizarea variațiilor de temperatură în aer și sol în cadrul observatorului geotermic OG1 în intervalul 2007 – 2009,** Contract nr. 96/2007 GAR, Director proiect: Dr. Crișan Demetrescu, membru corespondent al Academiei Române



**Variabilități heliosferice și impactul lor asupra unor componente ale sistemului terestru – HELIOTER**, Contract nr. 81-021/2007, PN II Proiecte complexe, Director proiect: Dr. Crișan Demetrescu, membru corespondent al Academiei Române  
Parteneri: Institutul de Științe Spațiale, Optoelectronica

**Variabilitatea de termen lung a câmpului magnetic terestru în relație cu procese fizice din heliosferă**, Contract nr. 151/2007 PNII IDEI, Director proiect: Dr. Crișan Demetrescu, membru corespondent al Academiei Române

**Tehnici și metodologii inovative de evaluare a riscului de hazard natural (cutremure și alunecări de teren) - TEMERISC**, Contract nr. 31-018/2007-2010 PN2, Director proiect Dr. Dumitru Stănică

**Parteneri:** Institutul Național de Cercetare-Dezvoltare pentru Fizica Pământului, Institutul Geografie al Academiei Române

**Cercetări asupra dinamicii spațio-temporale a câmpului magnetic terestru vizând construirea unor modele geomagnetice unitare pentru teritoriul României integrate în context european și global (DYGEF)**, Contract nr. X2C18/18.07.2006 CEEEX-AMTRANS, Director proiect: Dr. Lucian Beșuțiu

**Parteneri:** Universitatea Politehnică București, Institutul Geologic al României, Universitatea București

**Cercetări integrate privind geneza cutremurelor intracontinentale de adâncime intermediară din zona Vrancea (INDEGEN)**, Contract nr. 732/24.07.2006 CEEEX-MENER, Director proiect: Dr. Lucian Beșuțiu

**Parteneri:** Institutul Național de Cercetare Dezvoltare pentru Fizica Pământului, Institutul Geologic al României, Universitatea București, Universitatea Tehnică de Construcții Civile București

**Diversitatea geologică a Paleozoicului Superior din România și relația cu schimbările climatice globale (PALEOCLIM)**, Contract nr. 31-063/14.09.2007 PNCDI II, Director proiect Dr. Mihai Tatu

**Parteneri:** Universitatea București, Institutul Geologic al României, Administrația Națională de Meteorologie

## 2006

**Evoluția spațio-temporală a câmpului geomagnetic principal pe teritoriul României în contextul evoluției la scara continentului european**, Contract nr. 73/2006 GAR, Director proiect: Dr. Crișan Demetrescu, membru corespondent al Academiei Române

**Studiul proprietăților de atenuare a undelor seismice în litosferă pentru estimarea hazardului seismic pe teritoriul României – ATSEIS**, Contract nr. 726/2006 MENER, Director proiect: Dr. Maria Tumanian

**Parteneri:** Institutul Național de Cercetare-Dezvoltare pentru Fizica Pământului

## 2005

**Extreme Events: Causes and Consequences (E2-C2)**, Contract nr. 012975 (NEST)/2005-2008, Proiect EU FP6, Director proiect Dr.ing.Dorel Zugravescu, membru corespondent al Academiei Romane

Parteneri: Coordonator Ecole Normale Supérieure, Laboratoires de Météorologie Dynamique, Fonctionnement et Evolution des Systèmes Ecologiques, Physique Statistique, 14 parteneri din Franța, Germania, Marea Britanie, Italia, Rusia, SUA, Luxemburg

**Evoluția spațio-temporală a câmpului geomagnetic principal pe teritoriul României în contextul evoluției la scara continentului european**, Contract nr. 76/2005 GAR, Director proiect: Dr. Crișan Demetrescu, membru corespondent al Academiei Române

## 2004

**Particularități regionale ale evoluției câmpului geomagnetic principal și a celui de referință (normal) în Romania**, Contract nr. 033/2001 MENER, Director proiect: Dr. Crișan Demetrescu, membru corespondent al Academiei Române  
Parteneri: Institutul Geologic al României, Universitatea București

**Atenuarea undelor seismice în zona Vrancea și arealul adiacent**, Contract nr. 3-26/2003 CERES, Director proiect: Dr. Crișan Demetrescu, membru corespondent al Academiei Române  
Parteneri: Institutul Național de Cercetare-Dezvoltare pentru Fizica Pământului

**Sistem de monitorizare a schimbărilor climatice bazat pe măsurători integrate ale temperaturii în foraje – CLIMOSIS**, Contract nr. 405/2004 MENER, Director proiect: Dr. Crișan Demetrescu, membru corespondent al Academiei Române  
Parteneri: Administrația Națională de Meteorologie

**Echipament specializat mobil, destinat studiilor complexe în zone geodinamic active (zone seismogene, alunecări de teren, surpări de goluri subterane etc.) - EMCGA**, Contract nr. 093/2001-2004 MENER, Director proiect Dr. Dumitru Stănică  
Parteneri: Academia de Științe Tehnice din România

**Tehnologie și echipament specializat destinate urmării câmpurilor magnetoteluric și de stres în scopul evidențierii unor parametri cu caracter precursor seismelor vrâncene**, Contract nr. 230/2002-2004 MENER, Director proiect Dr. Dumitru Stănică  
Parteneri: Academia de Științe Tehnice din România, Institutul Național de Cercetare-Dezvoltare pentru Fizica Pământului

**Sistem complex de monitorizare a zonelor de risc natural ridicat datorat alunecărilor de teren - SMALT**, Contract nr. 441/2004-2006 MENER, Director proiect Dr. Dumitru Stănică  
Parteneri: Geocomar, Academia de Științe Tehnice din România

**Fundamentarea unei noi ipoteze privind relația dintre procesul de torsiune al slab-ului vrancean și evoluția segmentului sud-vestic al Platformei Est-Europene, cu implicații în producerea evenimentelor seismice - PROTORV**, Contract nr. 4-170/2004-2006 CERES, Director proiect Dr. Dumitru Stănică  
Parteneri: Universitatea București, Academia de Științe Tehnice din România

**Model spațio-temporal privind deformările crustei terestre în zone geodinamic active prin integrarea datelor terestre și spațiale (MODEST)**, Contract nr.3-39/06.11.2003 CERES, Director proiect Dr. Lucian Besutiu  
Parteneri: SC Topoexim SRL, Academia de Științe Tehnice din România

**Construcția unui model transfrontalier privind structura și dinamica marginii de SW a Platformei Est-Europene de pe teritoriul României și Ucrainei. Integrarea standardelor geomagnetice naționale (DEEP), Contract nr.92/2004 GAR, Director proiect: Dr. Lucian Beșuțiu**

Parteneri: Institutul de Geofizică al Academiei Naționale de Științe a Ucrainei

**Monografia cercetărilor de geodinamică din România - zona Vrancea (CERGOP-2), Contract nr. 4355/2004 CNGCFT, Director proiect: Dr. Lucian Beșuțiu**

**3D modelling of the hidden structure of the crust beneath Alpine tectonics of the East Carpathians based on geophysical data interpretation, with emphasize on the Vrancea active seismic zone: geodynamic aspects (TRIDEC), Acord bilateral de colaborare științifică România-Ucraina, Director proiect: Dr. Lucian Beșuțiu**

Parteneri: Institutul de Geofizică al Academiei Naționale de Științe a Ucrainei

**Noi imagini ale campului magnetic terestru din sud-estul Europei (date satelitare provenite de la satelitul Orsted) BRÂNCUȘI, Program bilateral de acțiuni integrate "Brançuși" (România-Franța), Director program: Dr.Ligia Atansiu**

Parteneri: Institutul de Fizica Globului – Paris

**Reconstituirea dinamicii litosferei și mantalei terestre din timpul terțiarului pe baza caracteristicilor petrologice a rocilor magmatice din Carpați, Contractul nr. 33051/24.06.2004 CNCSIS, Director proiect Dr. Ioan Seghedi**

**Relația petrogeneză-metalogeneză în studiul magmatitelor alpine din România, implicații în geodinamică, Contract nr. 3-35/14.11.2003 CERES, Director proiect Dr. Ioan Seghedi**

Parteneri: Academia de Științe Tehnice din România

**Magmatismul ofiolitic mezozoic din România; semnificații geodinamice, Contract nr. 4-45/4.11.2004 CERES, Director proiect Dr.Ionel Nicolae**

Parteneri: Academia de Științe Tehnice din România

#### **10. Conferences and congresses organized by the institute:**

- **MagNetE Workshop - 3rd European Repeat Station Network**, Bucharest 2007
- **E2C2-GIACS Advanced Summer School- Extreme Events: Nonlinear Dynamics and Time Series Analysis**, Comorova 2007
- **EMSEV-DEMETER Workshop - IVth International meeting organized by the Inter-Association Working Group of ElectroMagnetic Studies of Earthquakes and Volcanoes (EMSEV) and the second International workshop on the Detection of Electromagnetic Emissions Transmitted from Earthquake Regions (DEMETER)**, Sinaia 2008
- **International Expert Meeting on Carpathian Geodynamic Network**, November 19-21, 2009, Bucharest
- **International Conference SOLAR AND HELIOSPERIC INFLUENCES ON THE GEOSPACE** Bucharest, ROMANIA, 1 – 5 October 2012
- **Internațional workshop NEMO – Numerical Modelling Using High Performance Computing Infrastructures**, Bucharest, Romania, 10-11 June 2013