

## Sommaire / Contents

### tome 341, 2009

- **Hommage à Philippe Matte / Homage to Philippe Matte**  
**Jean-Marc Lardeaux** ..... 95
- **Avant-propos / Foreword**  
**Karel Schulmann** ..... 97
- **Avant-propos / Foreword**  
**Gwenn Péron-Pinvidic, Philippe Huchon, Gianreto Manatschal** ..... 357
- **Avant-propos / Foreword**  
**Anne-Marie Lézine** ..... 569
- **Avant-propos / Foreword**  
**Esteben Auken, Roger Guérin, Ghislain de Marsily, Pascal Sahlhac** ..... 795
- Géophysique externe, climat et environnement / External geophysics, climate and environment**
  - Modelling the impact of tectonics, surface conditions and sea surface temperatures on Saharan and sub-Saharan climate evolution  
**Pierre Sepulchre, Gilles Ramstein, Mathieu Schuster** .... 612
  - The speleothem record of climate variability in Southern Arabia  
**Dominik Fleitmann, Albert Matter** ..... 633
  - The role of the ocean feedback on Asian and African monsoon variations at 6 kyr and 9.5 kyr BP  
**Charline Marzin, Pascale Braconnot** ..... 643
  - Plant migration and plant communities at the time of the “green Sahara”  
**Julie Watrin, Anne-Marie Lézine, Christelle Hély, Contributors** ..... 656
  - Extracting wealth from a land of starvation by creating social complexity: A dialogue between archaeology and climate?  
**Serge Cleuziou** ..... 726
  - Timing of vegetation changes at the end of the Holocene Humid Period in desert areas at the northern edge of the Atlantic and Indian monsoon systems  
**Anne-Marie Lézine** ..... 750
- Climate and environmental change at the end of the Holocene Humid Period: A pollen record off Pakistan  
**Sarah J. Ivory, Anne-Marie Lézine** ..... 760
- Hydrogeological modeling as a tool supporting the interpretation of pollen proxies for palaeoclimate reconstitution: The Senegalese “niayes” case-study  
**Pascal Maugis, Lazar Aguiar, Christophe Grenier** ..... 783
- (Climat / Climate)**
  - A comparison of Indian and African monsoon variability at different time scales  
**Serge Janicot** ..... 575
- (Océanographie physique et chimique / Physical and chemical oceanography)**
  - Simulation of the turbidity maximum in the Seine estuary with a two-phase flow model  
**Julien Chauchat, Sylvain Guillou, Nathaly Barbry, Kim Dan Nguyen** ..... 505
- Géophysique interne / Internal geophysics**
  - Seismicity and volcanism in the rifted zone of western Syria  
**Ahmad Bilal** ..... 299
  - Réfutation de l’hypothèse sismo-acoustique invoquée pour le double bang de la catastrophe de Toulouse (France) du 21 septembre 2001  
**Alain Joets** ..... 306
  - Inner core structure: Constraints from frequency dependent seismic anisotropy  
**Annie Souriau** ..... 439
  - Grain structure of the Earth’s inner core  
**Lucile Venet, Thierry Duffar, Renaud Deguen** ..... 513
  - Microseismicity, meteorology and the solar cycle  
**Jean-Paul Poirier, Jean-Louis Le Mouél, Vincent Courtillot** ..... 977

**(Géophysique appliquée / Applied Geophysics)**

- Contribution of geophysical surveys to groundwater modelling of a porous aquifer in semiarid Niger: An overview  
**Marie Boucher, Guillaume Favreau, Marc Descloitres, Jean-Michel Vouillamoz, Sylvain Massuel, Yahaya Nazoumou, Bernard Cappelaere, Anatoli Legchenko** ..... 800
- Geophysical characterisation of karstic networks – Application to the Ouyse system (Poumeyssen, France)  
**Roger Guérin, Jean-Michel Baltassat, Marie Boucher, Konstantinos Chalikakis, Pierre-Yves Galibert, Jean-François Girard, Valérie Plagnes, Rémi Valois** ..... 810
- Characterizing the vadose zone and a perched aquifer near the Vosges ridge at the La Soutte experimental site, Obernai, France  
**Pascal Saille, Maksim Bano, Mickael Behaegel, Jean-François Girard, Ester Falgàs Para, Juanjo Ledo, Guy Marquis, Pierre-Daniel Matthey, José Ortega-Ramírez** ..... 818
- New *in situ* techniques for the estimation of the dielectric properties and moisture content of soils  
**Jean-Pierre Frangi, Daniel-Christian Richard, Xavier Chavanne, Idris Bexi, Florence Sagnard, Vincent Guilbert** ..... 831
- Ground penetrating radar imaging and time-domain modelling of the infiltration of diesel fuel in a sandbox experiment  
**Maksim Bano, Olivier Loeffler, Jean-François Girard** .... 846
- From spatial-continuous electrical resistivity measurements to the soil hydraulic functioning at the field scale  
**Isabelle Cousin, Arlène Besson, Hocine Bourennane, Catherine Pasquier, Bernard Nicoulaud, Dominique King, Guy Richard** ..... 859
- Monitoring hydraulic processes with automated time-lapse electrical resistivity tomography (ALERT)  
**Oliver Kuras, Jonathan D. Pritchard, Philip I. Meldrum, Jonathan E. Chambers, Paul B. Wilkinson, Richard D. Ogilvy, Gary P. Wealthall** ..... 868
- Influence of shallow infiltration on time-lapse ERT: Experience of advanced interpretation  
**Rémi Clément, Marc Descloitres, Thomas Günther, Olivier Ribolzi, Anatoli Legchenko** ..... 886
- An integrated study of the hydrogeology of volcanic islands using helicopter borne transient electromagnetic: Application in the Galápagos Archipelago  
**Esben Auken, Sophie Violette, Noémi d'Ozouville, Benoît Deffontaines, Kurt I. Sørensen, Andrea Viezzoli, Ghislain de Marsily** ..... 899
- Joint use of TEM and MRS methods in a complex geological setting  
**Anatoly Legchenko, Michael Ezersky, Christian Camerlynck, Abdallah Al-Zoubi, Konstantinos Chalikakis** ..... 908
- Investigation of sedimentary aquifers in Denmark using the magnetic resonance sounding method (MRS)  
**Konstantinos Chalikakis, Mette Ryom Nielsen, Anatoli Legchenko, Tom Feldberg Hagensen** ..... 918

- Review of self-potential methods in hydrogeophysics  
**Laurence Jouniaux, Alexis Mainault, Véronique Naudet, Marc Pessel, Pascal Saille** ..... 928
- Monitoring water flow in a clay-shale hillslope from geophysical data fusion based on a fuzzy logic approach  
**Gilles Grandjean, Clément Hibert, François Mathieu, Emilie Garel, Jean-Philippe Malet** ..... 937
- Pluri-annual recharge assessment using vertical soil temperature profiles: Example of the Seine river basin (1984–2001)  
**Alain Tabbagh, Roger Guérin, Hocine Bendjoudi, Bruno Cheviron, Mohamed-Amine Bechkit** ..... 949
- MuSET: A multiparameter and high precision sensor for downhole spontaneous electrical potential measurements  
**Philippe A. Pezard, Stéphanie Gautier, Tanguy Le Borgne, Bruno Legros, Jean-Luc Deltombe** ..... 957
- CoFIS and TELog: New downhole tools for characterizing dispersion processes in aquifers by single-well injection-withdrawal tracer tests  
**Philippe Gouze, Richard Leprovost, Thierry Poidras, Tanguy Le Borgne, Gérard Lods, Philippe A. Pezard** .... 965

**(Géodésie / Geodesy)**

- Wavelet application to the time series analysis of DORIS station coordinates  
**Zahia Bessissi, Mekki Terbeche, Boualem Ghezali** ..... 446

**Géomatériaux / Geomaterials****(Pétrologie / Petrology)**

- Genesis of adakite-like lavas of Licancabur volcano (Chile—Bolivia, Central Andes)  
**Oscar Figueroa, Bernard Déruelle, Daniel Demaiffe** ..... 310
- Chromite potential in mantle peridotites of the Jandaq ophiolite (central Iran)  
**Ghodrat Torabi** ..... 982

**(Sédimentologie / Sedimentology)**

- Does a strong pycnocline impact organic-matter preservation and accumulation in an anoxic setting? The case of the Orca Basin, Gulf of Mexico  
**Nicolas Tribouvillard, Viviane Bout-Roumazeilles, Thomas Sionneau, Jean Carlos Montero Serrano, Armelle Riboulleau, François Baudin** ..... 1

**(Métallogénie / Ore deposits)**

- Ni-Co sulphide segregation in the Mamb pyroxenite intrusion, Cameroon  
**Charles Nkoumbou, Frédéric Villiéras, Pierre Barbey, Clément-Yonta Ngoune, Robert Joussemet, Frédéric Diot, Daniel Njopwouo, Jacques Yvon** ..... 517

**Géochimie / Geochemistry**

- Données nouvelles sur le contenu organique des dépôts phosphatés du gisement de Ras-Draâ (Tunisie)  
**Aïda Ben Hassen, Jean Trichet, Jean-Robert Disnar, Habib Belayouni** ..... 319

**(Géochimie isotopique / Isotopic geochemistry)**

- Trace element variations in an archeological carbonate deposit from the antique city of Ostia: Environmental and archeological implications  
**Julie Carlut, Gilles Chazot, Hélène Dessales, Éloïse Letellier** ..... 10

**Géosciences de surface / Surface geosciences**

- Post-cropping change and dynamics in soil and vegetation properties after forest clearing: Example of the semi-arid Mikea Region (southwestern Madagascar)  
**Jean-Claude Leprun, Michel Grouzis, Herizo Randriambanona** ..... 526
- Chronology of the impact of Quaternary climate change on continental environments in the Arabian Peninsula  
**Frank Preusser** ..... 621

**(Hydrologie-Hydrogéologie / Hydrology-Hydrogeology)**

- Seawater intrusion and associated processes: Case of the Korba aquifer (Cap-Bon, Tunisia)  
**Lamia Kouzana, Abdallah Ben Mammou, Mennoubi Sfar Felfoul** ..... 21
- Equivalent block transmissivity in an irregular 2D polygonal grid for one-phase flow: A sensitivity analysis  
**Marco De Lucia, Chantal de Fouquet, Vincent Lagneau, Roberto Bruno** ..... 327
- Tsunami-induced groundwater salinization in southeastern India  
**Sophie Violette, Gilles Boulicot, Steven M. Gorelick** ..... 339
- Effects of rock fragments on water movement and solute transport in a Loess Plateau soil  
**Zhou Beibei, Shao Ming'an, Shao Hongbo** ..... 462
- Monitoring of water and heat transfer in the vadose zone of a carbonate formation: An example of an underground quarry in Gironde, France  
**Adrian Cerepi, Corinne Loisy, René Burlot** ..... 473
- 1896–2006 Sahelian annual rainfall variability and runoff increase of Sahelian Rivers  
**Gil Mahé, Jean-Emmanuel Paturel** ..... 538
- Assessment of Holocene surface hydrological connections for the Ounianga lake catchment zone (Chad)  
**Christophe Grenier, Philippe Paillou, Pascal Maugis** ..... 770
- The fresh water-seawater contact in coastal aquifers supporting intensive pumped seawater extractions: A case study  
**Sara Jorreto, Antonio Pulido-Bosch, Juan Gisbert, Francisco Sánchez-Martos, Isaac Francés** ..... 993

**(Pédologie / Pedology)**

- 3D representation of soil distribution: An approach for understanding pedogenesis  
**Frédéric Delarue, Sophie Cornu, Joël Daroussin, Sébastien Salvador-Blanes, Hocine Bourennane, Patrick Albéric, Aurélie Vennink, Ary Bruand, Dominique King** ..... 486

**(Paléoclimatologie / Palaeoclimatology)**

- Neogene desertification of Africa  
**Brigitte Senut, Martin Pickford, Loïc Ségalen** ..... 591

**(Paléoenvironnement / Palaeoenvironment)**

- Chad Basin: Palaeoenvironments of the Sahara since the Late Miocene  
**Mathieu Schuster, Philippe Düringer, Jean-François Ghiene, Claude Roquin, Pierre Sepulchre, Abderamane Moussa, Anne-Elisabeth Lebatard, Hassan Taïso Mackaye, Andossa Likius, Patrick Vignaud, Michel Brunet** ..... 603
- Climate and vegetation: Simulating the African humid period  
**Christelle Hély, Pascale Braconnot, Julie Watrin, Weipeng Zheng** ..... 671
- Early to Middle Holocene landscape exploitation in a drying environment: Two case studies compared from the central Sahara (SW Fezzan, Libya)  
**Mauro Cremaschi, Andrea Zerboni** ..... 689
- Coping with uncertainty: Neolithic life in the Dhar Tichitt-Walata, Mauritania, (ca. 4000–2300 BP)  
**Augustin F.C. Holl** ..... 703
- Modalities and characteristics of human occupations in Yemen during the Early/Mid-Holocene  
**Rémy Crassard** ..... 713
- The evolution of settlement patterns in the eastern Oman from the Neolithic to the Early Bronze Age (6000–2000 BC)  
**Jessica Giraud** ..... 739

**Océanographie / Oceanography**

- Formation and evolution of paleo-valleys linked to a subsiding canyon, North Aquitaine shelf (France)  
**Valérie Karin Bellec, Pierre Cirac, Jean-Claude Faugères** ... 36
- Ophiolites in ocean–continent transitions: From the Steinmann Trinity to sea-floor spreading  
**Daniel Bernoulli, Hugh C. Jenkyns** ..... 363
- Geophysical characterisation of the ocean–continent transition at magma-poor rifted margins  
**Timothy A. Minshull** ..... 382
- Initiation of transform faults at rifted continental margins  
**Brian Taylor, Andrew Goodliffe, Fernando Martinez** ..... 428

**(Géophysique marine / Marine geophysics)**

- Crustal structure of the NW Moroccan margin from deep seismic data (SISMAR Cruise)  
**Mohammed Jaffal, Frauke Klingelhoefer, Luis Matias, Fernando Teixeira, Mostafa Amrhar** ..... 495

**Stratigraphie / Stratigraphy**

- Analyse biostratigraphique et sédimentologique des séries éo-oligocènes et miocènes de la Tunisie septentrionale : implications stratigraphiques et géodynamiques  
**Kamel Boukhalfa, Kmar Ben Ismail-Lattrache, Sami Riahi, Mohamed Soussi, Sami Khomsi** ..... 49

- The Lochkovian–Pragian boundary in Podolia (Lower Devonian, Ukraine) based upon placoderm vertebrates  
**Vincent Dupret, Alain Blicek** ..... 63
- Tectonique / Tectonics**
- Vertical movements at the fringe of the West African Craton: First zircon fission track datings from the Anti-Atlas Precambrian basement, Morocco  
**Samira Sebti, Omar Saddiqi, Fatima Zahra El Haimer, André Michard, Geoffrey Ruiz, Romain Bousquet, Lahssen Baidder, Dominique Frizon de Lamotte** ..... 71
- Tectonic relationships of Southwest Iberia with the allochthons of Northwest Iberia and the Moroccan Variscides  
**José Fernando Simancas, Antonio Azor, David Martínez-Poyatos, Abdelfatah Tahiri, Hassan El Hadi, Francisco González-Lodeiro, Andrés Pérez-Estaún, Ramón Carbonell** ..... 103
- A rootless suture and the loss of the roots of a mountain chain: The Variscan belt of NW Iberia  
**José R. Martínez Catalán, Ricardo Arenas, Jacobo Abati, Sonia Sánchez Martínez, Florentino Díaz García, Javier Fernández Suárez, Pablo González Cuadra, Pedro Castiñeiras, Juan Gómez Barreiro, Alejandro Díez Montes, Emilio González Clavijo, Francisco J. Rubio Pascual, Pilar Andonaegui, Teresa E. Jeffries, James E. Alcock, Rubén Díez Fernández, Alicia López Carmona** ..... 114
- Mechanics of thick-skinned Variscan overprinting of Cadomian basement (Iberian Variscides)  
**António Ribeiro, José Munhá, António Mateus, Paulo Fonseca, Eurico Pereira, Fernando Noronha, José Romão, José Rodrigues, Paulo Castro, Carlos Meireles, Narciso Ferreira** ..... 127
- The Rheohercynian passive margin of SW England: Development, inversion and extensional reactivation  
**Robin K. Shail, Brian E. Leveridge** ..... 140
- Early Palaeozoic orogenic events north of the Rheic suture (Brabant, Ardenne): A review  
**Manuel Sintubin, Timothy Nick Debacker, Hervé Van Baelen** ..... 156
- Palaeozoic history of the Armorican Massif: Models for the tectonic evolution of the suture zones  
**Michel Ballèvre, Valérie Bosse, Céline Ducassou, Pavel Pitra** ... 174
- A review of the pre-Permian geology of the Variscan French Massif Central  
**Michel Faure, Jean-Marc Lardeaux, Patrick Ledru** ..... 202
- Late evolution of the southern European Variscan belt: Exhumation of the lower crust in a context of oblique convergence  
**Michel Corsini, Yann Rolland** ..... 214
- A restored section of the “southern Variscan realm” across the Corsica–Sardinia microcontinent  
**Philippe Rossi, Giacomo Oggiano, Alain Cocherie** ..... 224
- The Variscan evolution in the External massifs of the Alps and place in their Variscan framework  
**Jürgen F. von Raumer, François Bussy, Gérard M. Stampfli** ..... 239
- Paleozoic evolution of the External Crystalline Massifs of the Western Alps  
**Stéphane Guillot, René-Pierre Ménot** ..... 253
- An Andean type Palaeozoic convergence in the Bohemian Massif  
**Karel Schulmann, Jiří Konopásek, Vojtěch Janoušek, Ondřej Lexa, Jean-Marc Lardeaux, Jean-Bernard Edel, Pavla Štípská, Stanislav Ulrich** ..... 266
- Structural evolution of the Ural–Tian Shan junction: A view from Karatau ridge, South Kazakhstan  
**Dmitriy V. Alexeiev, Harry E. Cook, Vasilij M. Buvtyshkin, Lyudmila Y. Golub** ..... 287
- New insights on the structural style of the subsurface of the Tell units in north-western Tunisia issued from seismic imaging: Geodynamic implications  
**Sami Khomsi, Mohamed Soussi, Chokri Mahersi, Mourad Bédir, Héli Fakhfakh-Ben Jemia, Sami Riahi, Kamel Bou Khalfa** ..... 347
- Assessing the conditions of continental breakup at magma-poor rifted margins: What can we learn from slow spreading mid-ocean ridges?  
**Mathilde Cannat, Gianreto Manatschal, Daniel Sauter, Gwenn Péron-Pinvidic** ..... 406
- Albian extrusion evidences of the Triassic salt and clues of the beginning of the Eocene atlasic phase from the example of the Chitana-Ed Djebs structure (N.Tunisia): Implication in the North African Tethyan margin recorded events, comparisons  
**Mohamed-Montassar Ben Slama, Amara Masrouhi, Mohamed Ghanmi, Mohamed Ben Youssef, Fouad Zargouni** ..... 547
- C-axis fabrics of quartz-ribbons during high-temperature deformation of syn-tectonic granitoids (Sila Massif, Calabria, Italy)  
**Vincenzo Festa** ..... 557
- The Cuaró Mesozoic doleritic dyke swarm, southern Paraná basin, Uruguay: Examples of superimposed magnetic fabrics?  
**Henri Masquelin, Tahar Aïfa, Rossana Muzio, Erwan Hallot, Gerardo Veroslavsky, Laure Bonnevalle** ..... 1003
- Significance of Nain-Baft ophiolitic belt (Iran): Short-lived, transtensional Cretaceous back-arc oceanic basins over the Tethyan subduction zone  
**Hadi Shafaii Moghadam, Hubert Whitechurch, Mohamad Rahgoshay, Iman Monsef** ..... 1016
- Structural context of the paleogeography of the Cenomanian–Turonian anoxic event in the eastern Atlas basins of the Maghreb  
**Mohamed Soua, Oussema Echihi, Missoum Herkat, Dalila Zaghbib-Turki, Jalel Smaoui, Hela Fakhfakh-Ben Jemia, Houda Belghaji** ..... 1029
- Géodynamique / Geodynamics**
- Late Cretaceous syndimentary diapirism of Bazina–Sidi Bou Krime Triassic evaporites (northern Tunisia): Geodynamic implications  
**Fahmi Ben Mehrez, Jamel Kacem, Mahmoud Dlala** ..... 78
- Late Permian lamprophyric magmatism in North-East of Isfahan Province, Iran: A mark of rifting in the Gondwanaland  
**Ghodrat Torabi** ..... 85

- Melt initiation and mantle exhumation at the Iberian rifted margin: Comparison of pure–shear and upwelling–divergent flow models of continental breakup  
**Rosie Fletcher, Nick Kusznir, Mike Cheadle** ..... 394

#### Commentaire/Réponse / Commentary/Reply

- Commentaire à la note intitulée *Réfutation de l'hypothèse sismo-acoustique invoquée pour le double bang de la catastrophe de Toulouse (France) du 21 septembre 2001* de A. Joets [C. R. Geoscience 341 (2009) 306–309]  
**Michel Cara, Antoine Schlupp, Christophe Sira, Michel Granet** .....1038
- Réponse au commentaire de M. Cara, A. Schlupp, C. Sira et M. Granet à propos de la note de A. Joets (2009) : *Réfutation de l'hypothèse sismo-acoustique invoquée pour le double bang de la catastrophe de Toulouse (France) du 21 septembre 2001*, [C. R. Geoscience. 341 (2009) 306–309]  
**Alain Joets** .....1041
- Commentaire sur la note intitulée *Réfutation de l'hypothèse sismo-acoustique invoquée pour le double bang de la catastrophe de Toulouse (France) du 21 septembre 2001* de A. Joets

[C. R. Geoscience 341 (2009) 306–309]

**Annie Souriau, Alexis Rigo, Matthieu Sylvander** .....1043

- Réponse au commentaire de A. Souriau, A. Rigo et M. Sylvander à propos de la note de A. Joets (2009) : *Réfutation de l'hypothèse sismo-acoustique invoquée pour le double bang de la catastrophe de Toulouse (France) du 21 septembre 2001*, [C. R. Geosci. 341 (2009) 306–309]  
**Alain Joets** .....1046
- Comment on *Palaeolatitudes of glacial deposits and palaeogeography of Neoproterozoic ice ages* by Ricardo I.F. Trindade and Mélina Macouin [C. R. Geoscience 339 (2007) 200–211]  
**Qi-Rui Zhang, Xue-Lei Chu, Lian-Jun Feng** .....1049

**Tables du tome 341 / Tables of volume 341** .....1051

**Sommaire/Contents** .....1052

**Index des auteurs/Author index** .....1057

**Index des mots clés** .....1060

**Keyword index** .....1065