

Curriculum Vitae

Irene SCHIMMELPFENNIG

CEREGE

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E-mail: schimmel@cerege.fr

Citizenship: German

Languages: German, French, English, Spanish

Current appointment since 10/2014: Research scientist at CNRS UMR 7330 CEREGE

Principal research interests

- Understanding of past glacier-climate dynamics based on reconstruction of Holocene glacier chronologies from *in situ* cosmogenic nuclide dating.
- Technical development and methodological refinement of the *in situ* cosmogenic nuclide dating technique with focus on ^{14}C and ^{36}Cl .

Postdoctoral experience

09/2012 – 08/2014 **Associate Research Scientist (Maître de Conférences Associé)** at Collège de France, Chaire de l'évolution du climat et de l'océan – CEREGE (Aix en Provence, France)

04/2010 – 08/2012 **Postdoctoral Research Scientist/Fellow** at Lamont-Doherty Earth Observatory – Columbia University (New York, USA)

Education

09/2005 – 12/2009 **Graduate studies** at CEREGE – Université Aix-Marseille III and CRPG – CNRS (Nancy, France), advised by Dr. L. Benedetti (CEREGE), Dr. R. Pik (CRPG) and Prof. D. Bourlès (CEREGE)

1997 – 2004 **Undergraduate studies** at Geoscience Centre – Georg-August University of Göttingen (Germany)

Master of Science January 2004

Bachelor of Science February 2001

Fellowships and awards

2013 Certificate of Excellence in Reviewing awarded by the Editor-in-Chief of Quaternary Geochronology

07/2010 – 06/2012 **DAAD (German Academic Exchange Service) Postdoctoral Fellowship**

09/2005 – 08/2008 **Marie Curie Early Stage Researcher Fellowship** (Doctoral Fellowship) in the CRONUS-EU Research Training Network

Teaching and Training

09/2008 – 08/2009 **Assistant teacher** at Université Aix-Marseille III (half-time position): Lectures and practical courses in paleoclimatology, undergraduate level

Since 2016 **Teaching** 3h per year at Master level at Aix Marseille University (Glacial Geomorphology)

Since 2006 **Individual Training** of students, post-docs, and researchers (~7 on average per year) in lab procedures and data treatment for *in situ* cosmogenic nuclide dating

Supervision of students

Since 2020 **Co-supervision of PhD student** Joanna Charton: "Paleoclimatic reconstruction over the past 40 000 years using glacial chronologies on Kerguelen Archipelago based on cosmogenic chlorine-36"

2015 – 2019	Co-supervision of PhD student Marie Protin: “Study of glacial fluctuations in the Mont-Blanc massif since the end of the Younger Dryas using <i>in situ</i> cosmogenic nuclides”
2018 – 2022	Supervision of master students: four studies, all related to the reconstruction of glacial chronologies using surface exposure dating with the <i>in situ</i> cosmogenic nuclides beryllium-10 (¹⁰ Be) and chlorine-36 (³⁶ Cl)

Membership in panels

Since 2018	Member of the scientific and technical committee of the French National service for radiocarbon dating (LM14C)
Since 2019	Head of the “Green Committee” of CEREGE

Publications

2022

Moulin, A., Benedetti, L., Vidal, L., Hage-Hassan, J., Elias A., Van der Woerd, J., **Schimmelpfennig, I.**, Daëron, M., Tapponnier, P. (2022): LGM glaciers in the SE Mediterranean? First evidence from glacial landforms and ³⁶Cl dating on Mount Lebanon. *Quaternary Science Reviews* 283, *accepted*

Charton, J., **Schimmelpfennig, I.**, Jomelli, V., Delpech, G., Blard, P.-H., Braucher, R., Verfaillie, D., Favier, V., Rinterknecht, V., Goosse, H., Crosta, X., Chassiot, L., Martin, L., Guillaume, D., Legentil, C., ASTER Team (2022): New cosmogenic constraints on Late Glacial and Holocene glacier fluctuations in the sub-Antarctic Indian Ocean (Kerguelen Islands, 49°S). *Quaternary Science Reviews* 283, 107461, Doi: 10.1016/j.quascirev.2022.107461

Jomelli, V., Swingedouw, D., Vuille, M., Favier, V., Goehring, B., Shakun, J., Braucher, R., **Schimmelpfennig, I.**, Menviel, L., Rabatel, A., Martin, L.C.P., Blard, P.-H., Condom, T., Lupker, M., Christl, M., He, Z., Verfaillie, D., Gorin, A., Aumaître, G., Bourlès, D.L., Keddadouche, K. (2022): In-phase millennial-scale glacier changes in the tropics and North Atlantic regions during the Holocene. *Nature Communications* 13, 1-11. Doi : 10.1038/s41467-022-28939-9

Guilbaud, M.-N., Alcalá-Reygosa, J., **Schimmelpfennig, I.**, Arce, J.L., ASTER Team (2022): Testing less-conventional methods to date a late-pleistocene to Holocene eruption: Radiocarbon dating of paleosols and ³⁶Cl exposure ages at Pelado volcano, Sierra Chichinautzin, Central Mexico. *Quaternary Geochronology* 68, 101252. Doi: 10.1016/j.quageo.2022.101252

Schimmelpfennig, I., Schaefer, J., Lamp, J., Godard, V., Schwartz, R., Bard, E., Tuna, T., Akçar, N., Schlüchter, C., Zimmerman, S., ASTER Team (2022): Glacier response to Holocene warmth inferred from *in situ* ¹⁰Be and ¹⁴C bedrock analyses in Steingletscher’s forefield (central Swiss Alps). *Climate of the Past* 18, 23-44. Doi: 10.5194/cp-18-23-2022

García-Oteyza, J., Oliva, M., Palacios, D., Fernández-Fernández, J. M., **Schimmelpfennig, I.**, Andrés, N., Antoniadou, D., Christiansen, H.H., Humlum, O., Léanni, L., Jomelli, V., Ruiz-Fernández, J., Rinterknecht, V., Lane, T.P., Adamson, K., ASTER Team (2022): Late Glacial deglaciation of the Zackenberg area, NE Greenland. *Geomorphology*, 108125. Doi : 10.1016/j.geomorph.2022.108125

Hofmann, F.M., Preusser, F., **Schimmelpfennig, I.**, Léanni, L., ASTER Team (2022): Late Pleistocene glaciation history of the southern Black Forest, Germany (2022): ¹⁰Be cosmic-ray exposure dating and equilibrium line altitude reconstructions in Sankt Wilhelmer Tal. *Journal of Quaternary Science* 1-16. Doi: 10.1002/jqs.3407

2021

Tanarro, L.M., Palacios, D., Fernández-Fernández, J.M., Andrés, N., Oliva, M., Rodríguez-Mena, M., **Schimmelpfennig, I.**, Brynjólfsson, S., Sæmundsson, Þ., Zamorano, J.J., Úbeda, J., ASTER Team (accepted): Origins of the divergent evolution of mountain glaciers during deglaciation: Hofsdalur cirques, Northern Iceland. *Quaternary Science Reviews* 273, 107248. Doi: 10.1016/j.quascirev.2021.107248

Fernandes, M., Oliva, M., Vieira, G., Palacios, D., Fernández-Fernández, J.M., Delmas, M., García-Oteyza, J., **Schimmelpfennig, I.**, Ventura, J., ASTER Team (accepted): Maximum glacier extent of the Penultimate Glacial Cycle

in the Upper Garonne Basin (Pyrenees): new chronological evidence. *Environmental Earth Sciences* 80:796. Doi: 10.1007/s12665-021-10022-z

Leger, T.P.M., Hein, A.S., Goldberg, D., **Schimmelpfennig, I.**, Van Wyk de Vries, M.S., Bingham, R.G., ASTER Team (2021): Northeastern Patagonian glacier advances (43°S) reflect northward migration of the Southern Westerlies towards the end of the last glaciation. *Frontiers in Earth Science, section Cryospheric Sciences* 9, 751987. Doi: 10.3389/feart.2021.751987

Fernandes, M., Oliva, M., Vieira, G., Palacios, D., Fernández-Fernández, J. M., Garcia-Oteyza, J., **Schimmelpfennig, I.**, ASTER Team, Antoniades, D. (2021): Glacial oscillations during the Bølling–Allerød Interstadial–Younger Dryas transition in the Ruda Valley, Central Pyrenees. *Journal of Quaternary Science*. 10.1002/jqs.3379

Palacios, D., Rodríguez-Mena, M., Fernández-Fernández, J.M., **Schimmelpfennig, I.**, Tanarro, L.M., Zamorano, J.J., Andrés, N., Úbeda, J., Sæmundsson, Þ., Brynjólfsson, S., Oliva, M., ASTER. Team (2021): Reversible glacial-periglacial transition in response to climate changes and paraglacial dynamics: A case study from Héðinsdalsjökull (northern Iceland). *Geomorphology* 388, 107787. Doi: 10.1016/j.geomorph.2021.107787

Fernández-Fernández, J. M., Oliva, M., Palacios, D., Garcia-Oteyza, J., Navarro, F. J., **Schimmelpfennig, I.**, Léanni, L., ASTER Team. (2021): Ice thinning on nunataks during the glacial to interglacial transition in the Antarctic Peninsula region according to Cosmic-Ray Exposure dating: Evidence and uncertainties. *Quaternary Science Reviews*, 264, 107029.

Alcalá-Reygosa, J., Arce, J.L., Macías, J.L., **Schimmelpfennig, I.**, Saucedo, R., Sánchez, J.M., Carlon, T., Vasquez, R., Cisneros-Máximo, G., Jimenez, A., Fernández, S., ASTER Team (2021): New chronological constraints on intense Holocene eruptions and landslide activity at Tacana volcanic complex (Mexico). *Quaternary Geochronology* 65, 101183.

Oliva, M., Fernandes, M., Palacios, D., Fernández-Fernández, J. M., **Schimmelpfennig, I.**, Antoniades, D., ASTER Team (2021): Rapid deglaciation during the Bølling-Allerød Interstadial in the Central Pyrenees and associated glacial and periglacial landforms. *Geomorphology*, 107735.

Verfaillie, D., Charton, J., **Schimmelpfennig, I.**, Stroebel, Z., Jomelli, V., Bétard, F., Favier, V., Cavero, J., Berthier, E., Goosse, H., Rinterknecht, V., Legentil, C., Charrassin, R., Aumaître, G., Bourlès, L., Keddadouche, K. (2021): Evolution of the Cook Ice Cap (Kerguelen Islands) between the last centuries and 2100 CE based on cosmogenic dating and glacio-climatic modelling. *Antarctic Science*, Doi: 10.1017/S0954102021000080

Protin, M., **Schimmelpfennig, I.**, Mugnier, J.L., Buoncristiani, J.F., Le Roy, M., Pohl, B., Moreau, L., ASTER Team (2021): Millennial-scale deglaciation across the European Alps at the transition between the Younger Dryas and the Early Holocene – evidence from a new cosmogenic nuclide chronology. *Boreas*, Doi: 10.1111/bor.12519

2020

Charton, J., Jomelli, V., **Schimmelpfennig, I.**, Verfaillie, D., Favier, V., Mokadem, F., Gilbert, A., Brun, F., Aumaître, G., Bourlès, D., Keddadouche, K. (2020): A debris-covered glacier at Kerguelen (49°S, 69°E) over the past 15 000 years. *Antarctic Science*, Doi: 10.1017/S0954102020000541

Palacios, D., Oliva, M., Gómez-Ortiz, A., Andrés, N., Fernández-Fernández, J.M., **Schimmelpfennig, I.**, Léanni, L., ASTER Team (2020): Climate sensitivity and geomorphological response of cirque glaciers from the late glacial to the Holocene, Sierra Nevada, Spain. *Quaternary Science Reviews* 248, 106617. Doi: 10.1016/j.quascirev.2020.106617

Fernández-Fernández, J.M., Palacios, D., Andrés, N., **Schimmelpfennig, I.**, Tanarro, L.M., Brynjólfsson, S., López-Acevedo, F.J., Sæmundsson, Þ, ASTER Team (2020): Constraints on the timing of debris-covered and rock glaciers: an exploratory case study in the Hólar area, northern Iceland. *Geomorphology* 361, 107196

Palacios, D., Ruiz-Fernández, J., Oliva, M., Andrés, N., Fernández-Fernández, J.M., **Schimmelpfennig, I.**, Leanni, L., González-Díaz, B., ASTER Team (2020): Timing of formation of neoglacial landforms in the South Shetland Islands (Antarctic Peninsula): regional and global implications. *Quaternary Science Reviews* 234, 106248

2019

Bromley, G., Thouret, J.-C., **Schimmelpfennig, I.**, Mariño, J., Valdivia, D., Rademaker, K., Vivanco Lopez, S., ASTER Team (2019): In situ cosmogenic ^3He and ^{36}Cl and radiocarbon dating of volcanic deposits refine the Pleistocene and Holocene eruption chronology of SW Peru. *Bulletin of Volcanology*, 81:64

Protin, M., **Schimmelpfennig, I.**, Mugnier, J.L., Ravanel, L., Le Roy, M., Deline, P., Favier, V., Buoncristiani, J.F., ASTER Team (2019): Climatic reconstruction for the Younger Dryas/Early Holocene transition and the Little Ice Age based on paleo-extents of Argentière glacier (French Alps), *Quaternary Science Reviews* 221, 105863

Tylmann, K., Rinterknecht, V.R., Woźniak, P.P., Bourlès, D., **Schimmelpfennig, I.**, Guillou, V., ASTER Team (2019): The Local Last Glacial Maximum of the southern Scandinavian Ice Sheet front: Cosmogenic nuclide dating of erratics in northern Poland. *Quaternary Science Reviews* 219, 36-46.

Lamp, J.L., Young, N.E, Koffman, T., **Schimmelpfennig, I.**, Tuna, T., Bard, E., Schaefer, J.M. (2019): Update on the cosmogenic *in situ* ^{14}C laboratory at the Lamont-Doherty Earth Observatory. *Nuclear Inst. and Methods in Physics Research B*, 10.1016/j.nimb.2019.05.064

Fernández-Fernández, J.M., Palacios, D., Andrés, N., **Schimmelpfennig, I.**, Brynjólfsson, S., Sancho, L.G., Zamorano, J.J., Heiðmarsson, S., Sæmundsson, Þ, ASTER Team (2019): A multi-proxy approach to Late Holocene fluctuations of Tungnahryggsjökull glaciers in the Tröllaskagi peninsula (northern Iceland). *Science of the Total Environment* 664, 499–517.

Mechernich, S., Dunai, T.J., Binnie, S.A., Goral, T., Heinze, S., Dewald, A., **Schimmelpfennig, I.**, Keddadouche, K., Aumaître, G., Bourlès, D., Marrero, S., Wilcken, K. Simon, K., Fink, D., Phillips, F.M., Caffee, M.W., Gregory, L.C., Phillips, R., Freeman, S.P.H.T., Shanks, R., Sarikaya, M.A., Pavetich, S., Rugel, G., Merchel, S., Akçar, N., Yesilyurt, S., Ivy-Ochs, S., Vockenhuber, C. (2019): Carbonate and silicate intercomparison materials for cosmogenic ^{36}Cl measurements. *Nuclear Inst. and Methods in Physics Research B*, doi.org/10.1016/j.nimb.2019.01.024.

Palacios, D., Gómez-Ortiz, A., Alcalá-Reygosa, J., Andrés, N., Oliva, M., Tanarro, L.M., Salvador-Franch, F., **Schimmelpfennig, I.**, Fernández-Fernández, J.M., Léanni, L., ASTER Team (2019): The challenging application of cosmogenic dating methods in residual glacial landforms: The case of Sierra Nevada (Spain). *Geomorphology* 325, 103-118.

2018

Alcala-Reygosa, J., Arce, J.L., **Schimmelpfennig, I.**, Muñoz Salinas, E., Castillo Rodriguez, M., Léanni, L., ASTER Team (2018): Revisiting the age of the Jumento volcano, Chichinautzin Volcanic Field (Central Mexico), using in situ-produced cosmogenic ^{10}Be . *Journal of Volcanology and Geothermal Research* 366 (2018) 112–119.

Styllas, M.N., **Schimmelpfennig, I.**, Benedetti, L., Ghilardi, M., ASTER Team (2018): Late-glacial and Holocene history of the northeast Mediterranean mountain glaciers - New insights from in situ-produced ^{36}Cl -based cosmic ray exposure dating of paleo-glacier deposits on Mount Olympus, Greece. *Quaternary Science Reviews* 193, 244-265.

Alcalá-Reygosa, J., Palacios, D., **Schimmelpfennig, I.**, Vázquez-Selem, L., García-Sancho, L., Franco-Ramos, O., Villanueva, J., Zamorano, J.J., ASTER Team (2018): Dating late Holocene lava flows in Pico de Orizaba (Mexico) by means of *in situ*-produced cosmogenic ^{36}Cl , lichenometry and dendrochronology. *Quaternary Geochronology* 47, 93-106, doi.org/10.1016/j.quageo.2018.05.011

Vermeesch, P., Rittner, M., **Schimmelpfennig, I.**, Benedetti, L., ASTER Team (2018): Determining erosion rates in Allchar (Macedonia) to revive the Iorandite neutrino experiment. *Proceedings of the Royal Society A* 474: 20170470.

Jomelli, V., **Schimmelpfennig, I.**, Favier, V., Mokadem, F., Landais, A., Rinterknecht, V., Brunstein, D., Verfaillie, D., Legentil, C., Aumaitre, G., Bourlès, D., Keddadouche, K. (2018): Glacier extent in sub-Antarctic Kerguelen archipelago from MIS 3 period: Evidence from ^{36}Cl dating. *Quaternary Science Reviews* 183, 110-123.

2017

Le Roy, M., Deline, P., Carcaillet, J., **Schimmelfennig, I.**, Ermini, M., ASTER Team (2017): ^{10}Be exposure dating of the timing of Neoglacial glacier advances in the Ecrins-Pelvoux massif, southern French Alps. *Quaternary Science Reviews* 178, 118-138.

Fernandez-Fernandez, J.M., Palacios, D., García-Ruiz, J.M., Andrés, N., **Schimmelfennig, I.**, Gomez-Villar, A., Santos-Gonzalez, J., Alvarez-Martínez, J., Arnaez, J., Úbeda, J., Léanni, L., ASTER Team (2017): Chronological and geomorphological investigation of fossil debris-covered glaciers in relation to deglaciation processes: a case study in the Sierra de la Demanda, Northern Spain. *Quaternary Science Reviews* 170, 232-249.

Jomelli, V., Mokadem, F., **Schimmelfennig, I.**, Chapron, E., Rinterknecht, V., Favier, V., Verfaillie, D., Brunstein, D., Legentil, C., Michel, E., Swingedouw, D., Jaouen, A., Aumaitre, G., Bourlès, D., Keddadouche, K. (2017): Sub-Antarctic glacier extensions in the Kerguelen region (49°S, Indian Ocean) over the past 24 000 years constrained by ^{36}Cl moraine dating. *Quaternary Science Reviews* 162, 128-144.

Palacios, D., García-Ruiz, J.M., de Andres, N., **Schimmelfennig, I.**, Campos, N., Léanni, L., ASTER Team (2017): Deglaciation in the central Pyrenees during the Pleistocene–Holocene transition: timing and geomorphological significance. *Quaternary Science Reviews* 162, 111-127.

2016

Jomelli, V., Lane, T., Favier, V., Masson-Delmotte, V., Swingedouw, D., Rinterknecht, V., **Schimmelfennig, I.**, Brunstein, D., Verfaillie, D., Adamson, K., Leanni, L., Mokadem, F., ASTER Team (2016): Paradoxical cold conditions during the medieval climate anomaly in the Western Arctic. *Scientific Reports* 6, 32984.

Medynski, S., Pik, R., Burnard, P., Dumont, S., Grandin, R., Williams, A., Blard, P.-H., **Schimmelfennig, I.**, Vye-Brown, C., France, L., Ayelew, D., Benedetti, L., Yirgu, G., ASTER Team (2016): Magmatic cycles pace tectonic and morphological expression of rifting (Afar depression, Ethiopia). *Earth and Planetary Science Letters* 446, 77-88.

Ruszkiczay-Rüdiger Z., Kern, Z., Urdea, P., Braucher, R., Madarász, B., **Schimmelfennig, I.**, ASTER Team (2015): Revised deglaciation history of the Pietrele-Stânișoara glacial complex, Retezat Mts, Southern Carpathians, Romania. *Quaternary International* 415, 216-229. doi: 10.1016/j.quaint.2015.10.085

Styllas, M.N., **Schimmelfennig, I.**, Ghilardi, M., Benedetti, L. (2016): Geomorphologic and paleoclimatic evidence of Holocene glaciation on Mount Olympus, Greece. *The Holocene* 26, 709-721. doi: 10.1177/0959683615618259

2015

Medynski, S., Pik, R., Burnard, P., Vye-Brown, C., France, L., **Schimmelfennig, I.**, Whaler, K., Johnson, N., Benedetti, L., Ayelew, D., Yirgu, G. (2015): Stability of rift axis magma reservoirs: Spatial and temporal evolution of magma supply in the Dabbahu rift segment (Afar, Ethiopia) over the past 30 kyr. *Earth and Planetary Science Letters* 409, 278-289.

2014

Schimmelfennig, I., Schaefer, J., Putnam, A., Koffman, T., Benedetti, L., Ivy-Ochs, S., ASTER Team, Schlüchter, C. (2014): ^{36}Cl production rate from K-spallation in the European Alps (Chironico landslide, Switzerland). *Journal of Quaternary Science* 29, 407-413.

Schimmelfennig, I., Schaefer, J.M., Akçar, N., Koffman, T., Ivy-Ochs, S., Schwartz, R., Finkel, R.C., Zimmerman, S., Schlüchter, C. (2014): A chronology of Holocene and Little Ice Age glacier culminations of the Steingletscher, Central Alps, Switzerland, based on high-sensitivity beryllium-10 moraine dating. *Earth and Planetary Science Letters* 393, 220-230.

Young, N., Schaefer, J., Goehring, B., Lifton, N., **Schimmelfennig, I.**, Briner, J. (2014): West Greenland and global in situ ^{14}C production-rate calibrations. *Journal of Quaternary Science* 29, 401-406.

Goehring, B.M., **Schimmelfennig, I.**, Schaefer, J.M. (2014): Capabilities of the Lamont-Doherty Earth Observatory in situ ^{14}C extraction laboratory updated. *Quaternary Geochronology* 19, 194-197.

2012

Schimmelpfennig, I., Schaefer, J., Akçar, N., Ivy-Ochs, S., Finkel, R., Schlüchter, C. (2012): Holocene glacier culminations in the Western Alps and their hemispheric relevance. *Geology* 40, 891–894.

Schimmelpfennig, I., Schaefer, J., Goehring, B., Lifton, N., Putnam A., Barrell D. (2012): Calibration of the *in situ* cosmogenic ^{14}C production rate in New Zealand's Southern Alps. *Journal of Quaternary Science* 27, 671–674.

2011

Schimmelpfennig, I., Williams, A., Pik, R., Burnard, P., Niedermann, S., Finkel, R., Schneider, B., Benedetti, L. (2011): Inter-comparison of cosmogenic in-situ ^3He , ^{21}Ne and ^{36}Cl at low latitude along an altitude transect on the SE slope of the Kilimanjaro volcano (3°S, Tanzania). *Quaternary Geochronology* 6, 425-436.

Schimmelpfennig, I., Benedetti, L., Garreta, V., Pik, R., Blard, P.H., Burnard, P., Bourlès, D., Finkel, R. Ammon, K., Dunai, T. (2011): Calibration of cosmogenic ^{36}Cl production rates from Ca and K spallation in lava flows from Mt. Etna (38°N, Italy) and Payun-Matru (36°S, Argentina). *Geochimica et Cosmochimica Acta* 75, 2611-2632.

2010

Schlagenhauf, A., Gaudemer, Y., Benedetti, L., Manighetti, I., Palumbo, L., **Schimmelpfennig, I.**, Finkel, R., Pou, K. (2010): Using in-situ Chlorine-36 cosmonuclide to recover past earthquake histories on limestone normal fault scarps: A reappraisal of methodology and interpretations. *Geophysical Journal International* 182, 36-72.

2009

Schimmelpfennig, I., Benedetti, L., Finkel, R., Pik, R., Blard, P.H., Bourlès, D., Burnard, P., Williams, A. (2009): Sources of in-situ ^{36}Cl in basaltic rocks. Implications for calibration of production rates. *Quaternary Geochronology* 4, 441-461.

PhD Thesis:

Schimmelpfennig, I. (2009): Cosmogenic ^{36}Cl in Ca and K rich minerals: analytical developments, production rate calibrations and cross calibration with ^3He and ^{21}Ne . PhD Thesis, Université Aix-Marseille III (<http://tel.archives-ouvertes.fr/tel-00468337/fr>)