



1º Congresso Internacional de Geologia de Timor-Leste

1st International Congress of Geology of Timor-Leste

Programa | Livro de resumos

Program | Abstract book

Editor

Pedro Miguel Madureira Pimenta Nogueira | Universidade de Évora

Organização | Organization



Centro de Convenções de Dili | Mercado de Lama
Dili Convention Center | Mercado de Lama

16 a 20 de Janeiro de 2012
16th to 20th January, 2012

Num trabalho de 1968 Azeredo Leme apresenta a sua síntese sobre a geologia de Timor-Leste, bem como um mapa de síntese à escala 1:500.000. É também durante essa década que Audley-Charles realiza os seus primeiros trabalhos, que conduzem à sua tese de doutoramento e posteriormente à publicação de uma memória na sociedade geológica de Londres, que apresenta uma síntese e uma reinterpretação dos trabalhos efetuados até então. Nessa memória é apresentado um mapa à escala 1:250.000. Estes trabalhos são o marco fundamental do conhecimento geológico de Timor, estabelecendo as formações geológicas e as bases da paleogeografia e tectónica de Timor.

O terceiro período vai desde a ocupação indonésia de Timor-Leste em 1975 até 2002. Neste período é de referir a dificuldade em se voltar a efetuar trabalho de campo com segurança. Assim, numa análise dos trabalhos publicados sobre a geologia de Timor-Leste, a sua maioria são de reinterpretação dos trabalhos anteriores. Porém, neste período muitos trabalhos foram sendo desenvolvidos na parte ocidental da ilha. Estando Timor numa zona tectonicamente ativa e numa posição privilegiada para compreender muitos dos fenómenos relacionados com a tectónica de placas, a emergência deste novo paradigma veio trazer muitos trabalhos que procuraram reinterpretar a sua geologia à sua luz. Neste período os trabalhos apresentados de índole geral, como o levantamento geofísico e a interpretação da geologia do arquipélago indonésio pelos serviços geológicos estado-unidenses (Hamilton, 1979). São de salientar neste período também a continuação de alguns estudos dos investigadores de origem inglesa, como Harris, Charlton, Barber, Carter, etc. na continuação dos trabalhos de Audley-Charles. Autores australianos como Berry e Grady apresentam também durante este período estudos estruturais e de metamorfismo sobretudo na Formação de Aileu. Os autores de origem indonésia como Bachri, Harsomulakso, Partoyo, Prasetyadi, Rosidi e Tobing apresentaram trabalhos cartografia, tentando compatibilizar e atualizar a cartografia para as duas partes da ilha de Timor.

O quarto e último período da história da geologia de Timor-Leste vai desde a sua independência em 2002 até à atualidade. Neste período salientam-se trabalhos de enquadramento e evolução do sudeste asiático (Audley-Charles, Hall, Ribeiro e Leme), análise e reinterpretação da estratigrafia (Charlton, Haig e Villeneuve), de trabalhos de análise estrutural (Harris e Keep). Neste período são publicados os primeiros trabalhos de geólogos timorenses, sobre o seu território. Trabalho pioneiro é o de Francisco Monteiro que aborda a estratigrafia do Triássico-Jurássico de Timor-Leste. Desde então tem sido diversos os estudantes e futuros timorenses que tem sido envolvidos em trabalhos de geologia com equipas de diferentes origens, destacando-se a Austrália, a Coreia do Sul, a Indonésia, e Portugal. Este esforço trará com certeza no futuro novos conhecimentos geológicos e benefícios para o povo de Timor-Leste.

Referências Bibliográficas
(ver versão em inglês)

1CoGeoTiL: 1º Congresso Internacional de Geologia de Timor-Leste
1CoGeoTiL: 1st International Congress of Geology of Timor-Leste

NOTAS | NOTES

NOTAS | NOTES

Chronology of the geological studies in Timor-Leste

P. NOGUEIRA

Departamento de Geociências da Universidade de Évora; Centro de Geologia da Universidade do Porto. E-mail: pmn@uevora.pt

This paper presents the history of the geological knowledge of Timor based on the analysis of published papers that can be considered milestones for the geological knowledge of the Southeast Asia, and in particular the ones related with the territory of Timor-Leste. In the presentation I cover the period that starts in the first works of the naturalists of XIX century to the most recent issues that mark the main discussions and problems that the geology of Timor-Leste faces today.

The history of the knowledge of the geology of Timor-Leste can be divided into four major historical periods that coincide with some of the great periods in the national and international history.

The first period that spans from the XIX century until the beginning of World War II, begins with the work of the first naturalists and includes Wanner, Hirschi, Weber among others. These works were mainly of two types: initially the naturalists prevailed, describing and classifying the paleontology and stratigraphy of the region, the fossils and the main geological units were described, especially those involving the Permian and Triassic ages. A second type of studies with a strong economic character and supported by companies (e.g. Wittouck) that were engaged in the exploration of the overseas territories, were mainly concerned with the description of the mineral resources, oil and gas occurrences, especially onshore.

The second period elapses from the World War II until the Indonesian occupation of the territory in 1975. In this period the foundations of the nowadays knowledge of the geological units outcropping in East Timor were laid, mainly based on fieldwork conducted in the 50's and 60's of the XX century. This period is marked by the improvement of the knowledge of the territory with the promotion of diverse field missions: geological, geochemical and geophysical surveys conducted by the Portuguese government and private companies. This period is marked by the founding work of Grunau defending the existence of an Alpine-type structure with overthrust units. One example of this is the geophysics (gravimetric) work done G. Snoo. Regarding the definition of cartographic units the studies of Gageonnet and Lemoine beginning in 1955 are pioneers, defining the main geological formations. Azeredo Leme started working in the geology of the territory included in a mission of the Portuguese government, made extensive surveys in the territory publishing the first maps of Atauro and Oecussi, as well as extensive cartography on the scale of 1:50.000 area east of the then Portuguese Timor.

In a 1968 work Azeredo Leme presents the synthesis of the geology of East Timor. This author also published an overview geological map of Timor-Leste in the 1:500,000 scale. It is also during this decade that Audley-Charles performs his first works, leading to his doctoral thesis (1965) and a later publication of a Memory in the Geological Society of London, which presents new key aspects and a synthesis and reinterpretation of the work done so far. In this work a geological map is presented at the scale 1:250,000. I consider these works the rosetastone of the geological knowledge of Timor, establishing the geological formations and the foundations of paleogeography and tectonics of Timor discussed thereafter.

The third period goes from the Indonesian occupation of Timor-Leste in 1975 until 2002, the date of the independence. During this period it is noted the difficulty in performing fieldwork safely. Thus most of the papers published are re-interpretations of previous works. However, in this period many works were being developed in the western part of the island. Timor being a tectonically active area and in a unique position to understand many of the phenomena related to plate tectonics, the emergence of this new paradigm has brought many publications that discuss and reinterpret the geology. During this period there are works presented of a general nature, such as the geophysical survey and interpretation of the geology of the Indonesian archipelago by the U.S. Geological Survey by Hamilton. It is worth mentioning in this period also the continuation of the studies of researchers from England, like Harris, Charlton, Barber, Carter, etc. and the continuation of the work of Audley-Charles. Australian authors such as Berry and Grady also presented papers during this period studying the metamorphism and the structural aspects especially of the Aileu Formation. The authors of Indonesian origin such as Bachri, Harsomulakso, Partoyo, Prasetyadi, Rosidi and Tobing presented papers and geological maps, trying to reconcile and update the knowledge of the two parts of the island of Timor.

The fourth and last period of the geological history of Timor-Leste starts after the independence in 2002 and lasts until today. In this period new papers were published providing new insights to: the paleogeography and evolution of the Southeast of Asia (Audley-Charles, Hall, Ribeiro and Leme), analysis and reinterpretation of the stratigraphy (Charlton, Haig and Villeneuve), structural and tectonic studies (Harris, Keep). In this period we can find the first published work of geologists from Timor-Leste on their own territory. The work of Francisco Monteiro is pioneer addressing the Triassic-Jurassic stratigraphy of Timor-Leste. Since then there have been many Timorese students who have been involved in work with teams of different geological origins, especially Australia, Indonesia, South Korea and Portugal. This effort will surely, in the future, provide new geological knowledge and benefits to the people of Timor-Leste.

NOTAS | NOTES

NOTAS | NOTES

Bibliographic References

Audley-Charles, M. G., 1968. The Geology of Portuguese Timor. *Mem. Geol. Soc. London* 4, 1–76.

Audley-Charles, M. G., 2004. Ocean trench blocked and obliterated by Banda forearc collision with Australian proximal continental slope. *Tectonophysics* 389, 65–79.

Audley-Charles, M., 2011. Tectonic post-collision processes in Timor. in Hall, R., Cottam, M. A. & Wilson, M. E. J. (eds) *The SE Asian Gateway: History and Tectonics of the Australia–Asia Collision*. Geological Society, London, Special Publications, 355, 241–266.

Bachri, S. & Situmorang, R.L. 1994. Geological map of the Dili Sheet, East Timor. 1:250,000. GRDC.

Barber, A. J., Audley-Charles, M. G. & Carter, D. J., 1977. Thrust Tectonics in Timor. *J. geol. Soc. Austral.* 24, 51–62.

Berry, R.F., Grady, A.E., 1981. Deformation and metamorphism of the Aileu Formation, north coast, East Timor and its tectonic significance. *Journal of Structural Geology* 3, 143–167.

Charlton, T. R., Barber, A. J., McGowan, A. J., Nicoll, R. S. Roniewicz, E., Cook, S. E., Barkham, S. T. & Bird, P. R., 2009. The Triassic of Timor: Lithostratigraphy, chronostratigraphy and palaeogeography. *Journal of Asian Earth Sciences* 36. 341–363.

Gageonnet, R. & Lemoine, M., 1958. Contribution à la connaissance de la géologie de la province portugaise de Timor. *Estudos Ensaios Docum. Junta Invest. Ultramar Lisboa* 48, 1–136.

Grunau, H. 1953. Geologie von Portugiesisch Ost-Timor: eine kurze übersicht. *Eclog. Geol. Helv.* 46, 29-37.

Grunau, H. 1956. Zur geologie von Portugiesisch Ost-Timor. *Mitt. Naturf. Ges. Bern* 13, 11-18.

Grunau, H. 1957. Geologia da parte oriental do Timor Português. *Garcia da Orta* 5, 727-737.

Haig, D.W., 2004. Stratigraphic reconstruction of Timor Leste and correlation to the Bonaparte Basin (abstract). PESA (Petroleum Exploration Society of Australia) Newsletter, December.

Haig, D.W., McCartain, E.W., Keep M., & Barber, L. 2008. Re-evaluation of the Cablac Limestone at its type area, East Timor: Revision of the Miocene stratigraphy of Timor. *J. Asian Earth Sci.* 33(5-6), 366-378.

Hall, R., 2011. Australia–SE Asia collision: plate tectonics and crustal flow. in Hall, R., Cottam, M. A. & Wilson, M. E. J. (eds) *The SE Asian Gateway: History and Tectonics of the Australia–Asia Collision*. Geological Society, London, Special Publications, 355, 75-109.

- Hamilton, W. 1979. Tectonics of the Indonesian Region. U.S. Geol. Surv. Prof. Pap. 1078.
- Harris, R., Sawyer, R. K. & Audley-Charles, M., 1998. Collisional mélange development: Geologic association of active melange-forming processes with exhumed melange facies in the western Banda orogen, Indonesia. *Tectonics* 17, 458–479.
- Harsolumakso, A. H., 1993. Etude lithostratigraphique et structurale le long du transect Wini-Kolbano à Timor Ouest (Indonésie). Unpublished Thesis, University of Nice-Sophia-Antipolis, Valbonne (Fr), 256pp.
- Keep, M., Haig, D.W., 2009. Deformation and exhumation in Timor: Distinct stages of a young orogeny, *Tectonophysics*.
- Leme, J. de Azeredo & Coelho, A.V.P. 1962. Geologia do enclave de Ocussi, Provincia de Timor. *Garcia de Orto* 10, 553-566.
- Leme, J. de Azeredo & Pissara, J.B. 1962. Notas sobre a geologia e petrografia da ilha de Atauro (Timor). *Estudos Oferecidos em Homenagem ao Prof. Carrington da Costa, Junta Inv. Ultramar*, 325-348.
- Leme, J. de Azeredo. 1962. The geological map of Portuguese Timor (the eastern end) – a preliminary sketch. *Reg. Conf. SE Asian Geographers (Kuala Lumpur)*.
- Leme, J. de Azeredo. 1963. The eastern end geology of Portuguese Timor. *Garcia de Orta* 11, 379-388.
- Leme, J. de Azeredo. 1968. Breve ensaio sobre a geologia da provincia de Timor. *Curso de Geologia de Ultramar* 1, 105-161.
- Monteiro, F. da Costa, 2003. Late Triassic strata from East Timor: stratigraphy, sedimentology and hydrocarbon potential. M.Sc. thesis, Auckland University.
- O'Connor, S., Spriggs, M., Veth, P., 2002. Excavation at Lene Hara establishes occupation in East Timor at least 30,000 e 35,000 years ago: results of recent fieldwork. *Antiquity* 76, 45 e 50.
- Partoyo, E., Hermanto, B. & Bachri, S. 1995. Geological map of the Baucau Quadrangle, East Timor. 1:250,000. GRDC.
- Ribeiro, A. & Leme, J.C.A. (2010) – Geologia de Timor. In: Neiva, J.M.; Ribeiro, A.; Mendes Victor, L.; Noronha, F. & Ramalho, M. (Eds.) – *Ciências Geológicas – Ensino e Investigação e sua História, Associação Portuguesa de Geólogos; Sociedade Geológica de Portugal*, Vol. III: 279-284.
- Rosidi, H. M. D., Suwitodridjo, K. & Tjokosopoetro, S., 1979. Geological map of Kupang-Atambua quadrangle, Timor, 1:250 000. *Geol. Res. Dev. Centre, Bandung, Indonesia*.

NOTAS | NOTES

NOTAS | NOTES

Sawyer, R. S., Brown, S. & Kartono, S., 1993. Stratigraphy and sedimentology of West Timor, Indonesia. Proceedings of the 22nd annual Indonesian petroleum association Convention, 533–574.

Villeneuve, M., Cornée, J., Harsolumakso, A., Martini, R. & Zaninetti, L., 2005. Révision stratigraphique de l'île de Timor (Indonésie orientale). Eclogae Geol. Helv. 98, 297–310.

Wanner, J. (ed.) 1914-1929. Palaontologie von Timor (16 volumes). Stuttgart.

Wittouck, S.F., 1937. Exploration of Portuguese Timor. Report of Allied Mining Corp. to Asia Investment Co. Ltd., Amsterdam (Kolff).