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読みやすさ・機能性・モバイル対応の面で、これまでの電子ジャーナルとは一線を画した新しいフォーマットを実現しています。

journal of the American Ceramic Society

Rapid Communications

**A Special Configuration of Lead Zirconate Titanate Multilayer Stack with Superior Electrical and Optical Properties**

Ting Zhang, Gu-Jin Hu, Hai-Jun Bu, Rui Cong, Xin Chen, Guo-Lin Yu, Xiang-Jian Meng, Jun-Hao Chu, Ning Dai

First published: 12 July 2011 Full publication history  
DOI: 10.1111/j.1551-2916.2011.04701.x  
Citing literature  
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Abstract

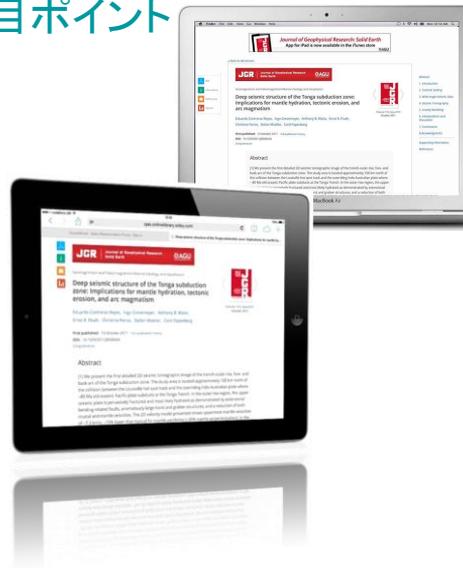
A unique configuration of  $\text{PbZr}_{0.4}\text{Ti}_{0.6}\text{O}_3$  multilayer stack was designed and grown on F-doped tin oxide thin film by spin casting and annealing process. The multilayer system exhibits a broad reflection band with peak reflectivity over 95% and band width no <math>\leq 40\text{ nm}</math>, a dielectric constant of 520 and dielectric tunability of ~49% at 1 MHz, a remanent polarization of 46.8  $\mu\text{C}/\text{cm}^2$ , and a polarization loss of <math>< 5\%</math> after  $10^5</math> polarization switching cycles, rendering excellent performance as 1D photonic crystals and as ferroelectric and dielectric media. This material structure may find application in photonic band-gap engineering, microwave tunable devices, and integrated optoelectronics.$

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## Anywhere Article の注目ポイント

- ① 読みやすさ
- ② 機能性
- ③ モバイル対応





## Anywhere Article の注目ポイント

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**Deep seismic structure of the Tonga subduction zone: Implications for mantle hydration, tectonic erosion, and arc magmatism**

Eduardo Contreras-Rojas, Ingo Greweneyer, Anthony B. Watts, Ernst R. Flueh, Christine Peiris, Stefan Mueller, Cord Papenberg

First published: 13 October 2011 | Full publication history  
DOI: 10.1029/2009JG013434  
Citing literature

**Abstract**

[1] We present the first detailed 2D seismic tomographic image of the trench-outer rise, fore- and back-arc of the Tonga subduction zone. The study area is located approximately 100 km north of the collision between the Louisville hot spot track and the overriding Indo-Australian plate where ~80 Ma old oceanic Pacific plate subducts at the Tonga Trench. In the outer rise region, the upper oceanic plate is pervasively fractured and most likely hydrated as demonstrated by extensional bending-related faults, anomalously large horst and graben structures, and a reduction of both

**Table of Contents:**

1. Introduction
2. Tectonic Setting
3. Wide-Angle Seismic Data
4. Seismic Tomography
5. Gravity Modeling
6. Interpretation and Discussion
7. Conclusions

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Deep seismic structure of the Tonga subduction zone: Implications for mantle hydration, tectonic erosion, and arc magmatism

Eduardo Contreras-Reyes, Ingo Grevemeyer, Anthony B. Watts, Ernst R. Flueh, Christine Peirce, Stefan Moeller, Cord Papenberg

First published: 13 October 2011 Full publication history  
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Abstract

[1] We present the first detailed 2D seismic tomographic image of the back-arc of the Tonga subduction zone. The study area is located at the collision between the Louisville hot spot track and the overriding Indo-Australian plate where ~80 Ma old oceanic Pacific plate subducts at the Tonga Trench. In the outer rise region, the upper oceanic plate is pervasively fractured and most likely hydrated as demonstrated by extensional bending-related faults, anomalously large horst and graben structures, and a reduction of both

Volume 116, Issue B10  
October 2011

Abstract

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hydration; island arc; mantle  
wedge; tectonic erosion

**Index terms**

Subduction zone processes  
Submarine landslides

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**References**

Hacker, B. R. (2008). H2O subduction beyond arcs. *Geochim. Geophys. Geosci.*, 1, Q03001. doi:10.1029/2007GC001707

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Hacker, B. R., S. M. Peacock, G. A. Abers, and S. D. Hollister (2003). Subduction factory: 2. Are intermediate-depth earthquakes in subducting slabs linked to metamorphic dehydration reactions? *J. Geophys. Res.*, 108(B1), 3038. doi:10.1029/2001JB001129

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Hamilton, E. L. (1978). Sound velocity density

crustal and mantle velocities. The 2D velocity model presented shows uppermost mantle velocities of ~7.3 km/s, ~10% lower than typical for mantle peridotite (~30% mantle serpentinization). In the model, Tonga arc crust ranges between 7 and 20 km in thickness, and velocities are typical of arc-type (igneous basement with uppermost and lowermost crustal velocities of ~3.5 and ~7.1 km/s, respectively. Beneath the inner trench slope, however, the presence of a low velocity zone (4.0–5.5 km/s) suggests that the outer fore-arc is probably fluid-saturated, metamorphosed and disaggregated by fracturing as a consequence of frontal and basal erosion. Tectonic erosion has, most likely, been accelerated by the subduction of the Louisville Ridge, causing crustal thinning and subsidence of the outer fore-arc. Extension in the outer fore-arc is evidenced by (1) trenchward-dipping normal faults and (2) the presence of a giant scarp (~2 km offset and several hundred kilometers long) indicating gravitational collapse of the outermost fore-arc block. In addition, the contact between the subducting slab and the overriding arc crust is only 20 km wide, and the mantle wedge is characterized by low velocities of ~7.5 km/s, suggesting upper mantle serpentinization or the presence of melts frozen in the mantle.

**1. Introduction**

[2] The amount of volatiles stored within the subducting oceanic lithosphere play a crucial role in arc volcanism and metamorphism of the overlying mantle wedge. At depths between ~60–80 km, dewatering of subducting oceanic crust largely occurs by metamorphism of the oceanic crust to amphibolite and eclogite facies, which leads to hydration of the mantle wedge [ANICORP Working Group, 1999; Ruepeke et al., 2004; Hacker et al., 2003]. At depths of 100–120 km, eclogitization is complete [Hacker et al., 2003]. The subducting lithospheric mantle dehydrates at an elevated temperature which results in partial melting of the overriding mantle, and which generates magmas that buoyantly rise to form the associated island arc [Ulmer and Trommsdorff, 1995; Ruepeke et al., 2004]. Thus, the amount of water subducted dictates the generation of arc magmas, the rheology of the mantle wedge, and the global circulation of water [e.g., Hacker, 2008].

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Figure 6

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Figure 9

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Figure 5  
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Figure 7  
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Figure 9

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Figure 9.  
Summarized interpretation of the tomographic velocity model (Figure 4). The highly hydrated Pacific plate subducts beneath the Indo-Australian plate at the Tonga Trench, with melt rising from the subducting slab to form the volcanic Tonga Ridge (the active Tonga arc). Dehydration reactions in the subducting crust promote mantle wedge hydration. The arc crust at the top of the Indo-Australian plate is highly fractured by tectonic erosion. The outer fore-arc is affected by extension, where a huge scarp of 2 km offset has been formed trenchward of the trench slope high.

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6.1. The Trench-Outer Rise Region  
[32] In the trench-outer rise region, uppermost crustal velocities are lower than 3.5 km/s, and are

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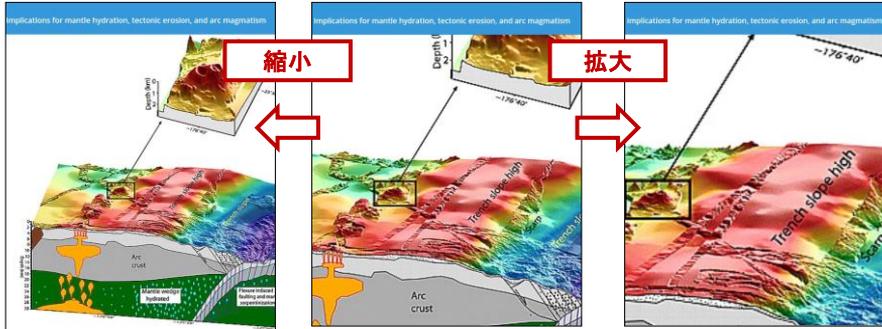
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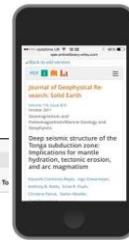
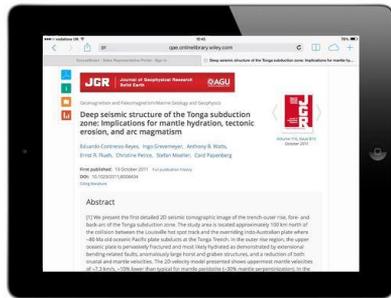
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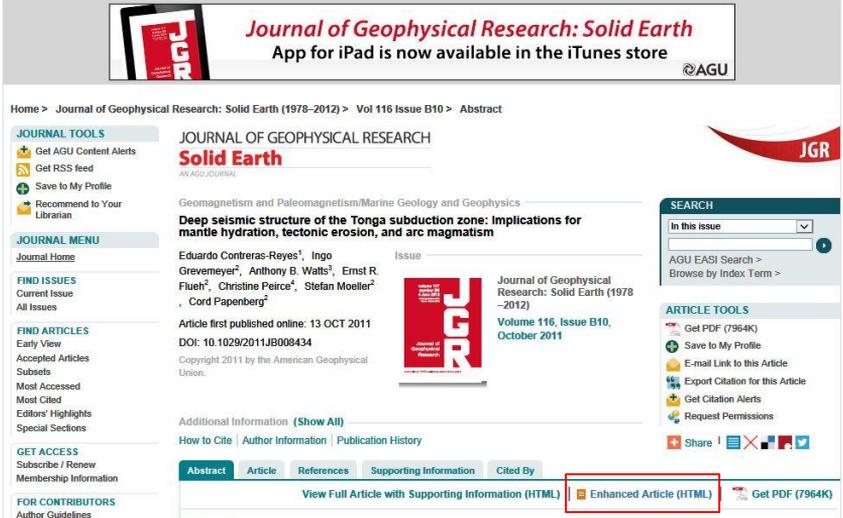


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**Deep seismic structure of the Tonga subduction zone: Implications for mantle hydration, tectonic erosion, and arc magmatism**

Eduardo Contreras-Reyes<sup>1</sup>, Ingo Grevemeyer<sup>2</sup>, Anthony B. Watts<sup>3</sup>, Ernst R. Flueh<sup>2</sup>, Christine Peirce<sup>4</sup>, Stefan Moeller<sup>2</sup>, Cord Papenberg<sup>2</sup>

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