

2009

## Exploring CO pollution episodes observed at Rishiri Island by chemical weather simulations and AIRS satellite measurements: long-range transport of burning plumes and implications for emissions inventories

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### Recommended Citation

Tanimoto, Hiroshi; Sato, Keiichi; Butler, Tim; Lawrence, Mark G.; Fisher, Jenny A.; Kopacz, M; Yantosca, Robert M.; Kanaya, Yugo; Kato, Shungo; Okuda, Tomoaki; Tanaka, Shigeru; and Zeng, Jiye: Exploring CO pollution episodes observed at Rishiri Island by chemical weather simulations and AIRS satellite measurements: long-range transport of burning plumes and implications for emissions inventories 2009, 394-407.

<https://ro.uow.edu.au/scipapers/4697>

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# Exploring CO pollution episodes observed at Rishiri Island by chemical weather simulations and AIRS satellite measurements: long-range transport of burning plumes and implications for emissions inventories

## Abstract

The summer of 2003 was an active forest fire season in Siberia. Several events of elevated carbon monoxide (CO) were observed at Rishiri Island in northern Japan during an intensive field campaign in September 2003. A simulation with a global chemistry-transport model is able to reproduce the general features of the baseline levels and variability in the observed CO, and a source attribution for CO in the model suggests that the contribution from North Asia dominated, accounting for approximately 50% on average, with contributions of 7% from North America and 8% from Europe and 30% from oxidation of hydrocarbons. With consideration of recent emission estimates for East Asian fossil fuel and Siberian biomass burning sources, the model captures the timing and magnitude of the CO enhancements in two pollution episodes well (17 and 24 September). However, it significantly underestimates the amplitude during another episode (11–13 September), requiring additional CO emissions for this event. Daily satellite images from AIRS reveal CO plumes transported from western Siberia toward northern Japan. These results suggest that CO emissions from biomass burning in western Siberia in 2003 are likely underestimated in the inventory and further highlight large uncertainties in estimating trace gas emissions from boreal fires.

## Keywords

measurements, satellite, emissions, inventories, airs, simulations, weather, implications, chemical, plumes, island, rishiri, observed, episodes, pollution, co, exploring, burning, transport, range, long, GeoQUEST

## Disciplines

Life Sciences | Physical Sciences and Mathematics | Social and Behavioral Sciences

## Publication Details

Tanimoto, H., Sato, K., Butler, T., Lawrence, M. G., Fisher, J. A., Kopacz, M., Yantosca, R. M., Kanaya, Y., Kato, S., Okuda, T., Tanaka, S. & Zeng, J. (2009). Exploring CO pollution episodes observed at Rishiri Island by chemical weather simulations and AIRS satellite measurements: long-range transport of burning plumes and implications for emissions inventories. *Tellus, Series B: Chemical and Physical Meteorology*, 61B (2), 394-407.

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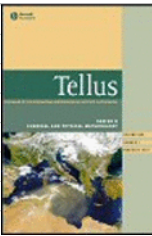


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### Basic Description

<b>Title</b>	Tellus. Series B: Chemical and Physical Meteorology (Print)	
<b>ISSN</b>	0280-6509	
<b>Publisher</b>	Wiley-Blackwell Publishing, Inc.	
<b>Country</b>	United States	
<b>Status</b>	Ceased	
<b>Start Year</b>	1949	
<b>End Year</b>	2011	
<b>Publication History</b>	1949-2011 (Nov.)	
<b>Frequency</b>	Bi-monthly	
<b>Volume Ends</b>	Nov	
<b>Language of Text</b>	Text in: German, French, English Summaries in: English	
<b>Refereed</b>	 Yes	
<b>Abstracted / Indexed</b>	Yes	
<b>Open Access</b>	 Yes	
<b>Serial Type</b>	Journal	
<b>Content Type</b>	Academic / Scholarly	
<b>Format</b>	Print	
<b>Website</b>	<a href="http://www.wiley.com/bw/journal.asp?ref=0280-6509&amp;site=1">http://www.wiley.com/bw/journal.asp?ref=0280-6509&amp;site=1</a>	
<b>Email</b>	<a href="mailto:tellusb@misu.su.se">tellusb@misu.su.se</a>	

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