# Supplementary Information

Global dispersion of bacterial cells on Asian dust

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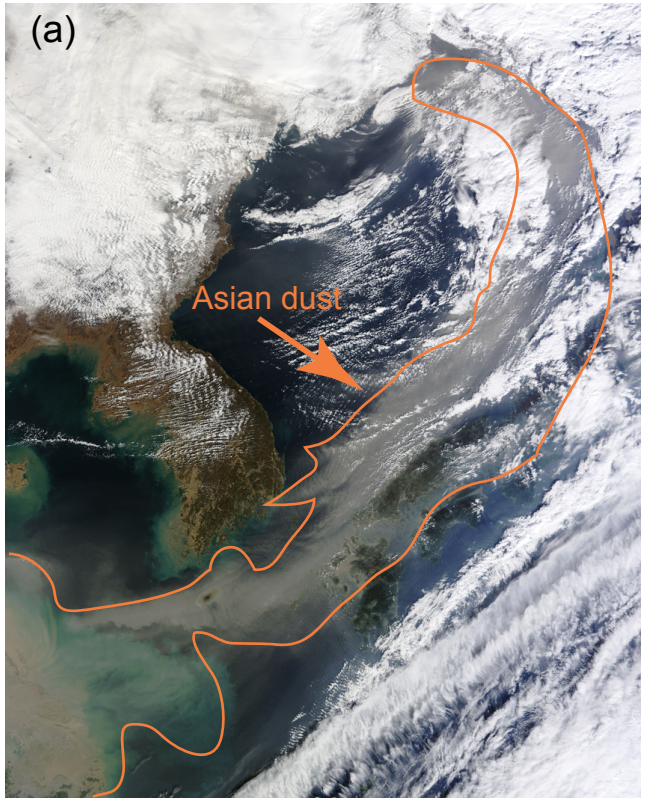
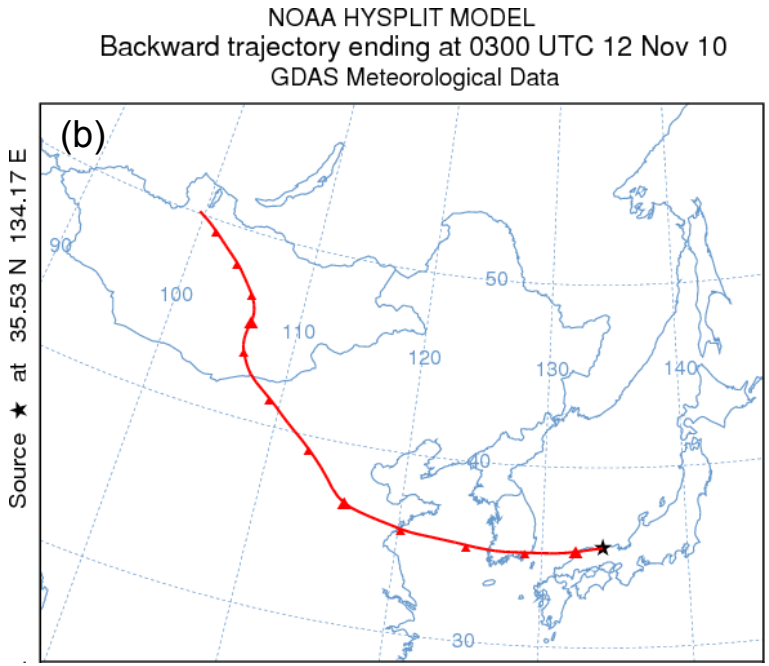
Supplementary Figures 1-6 & Supplementary Table 1



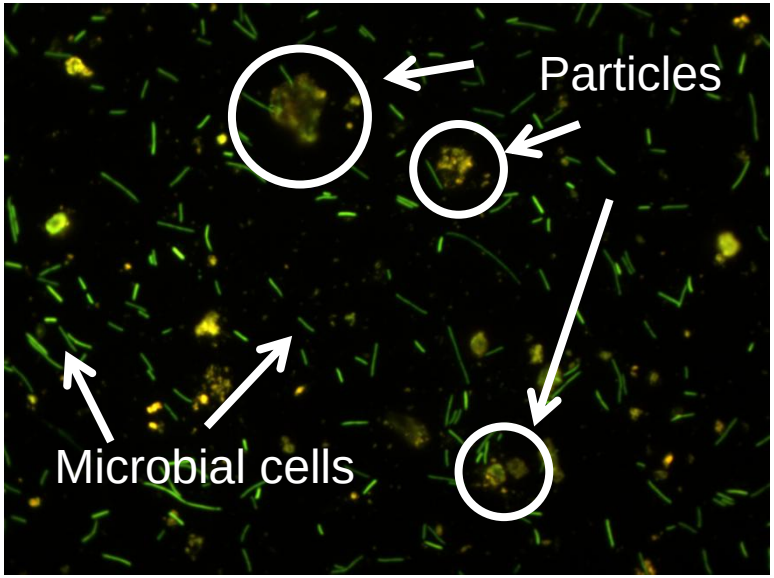



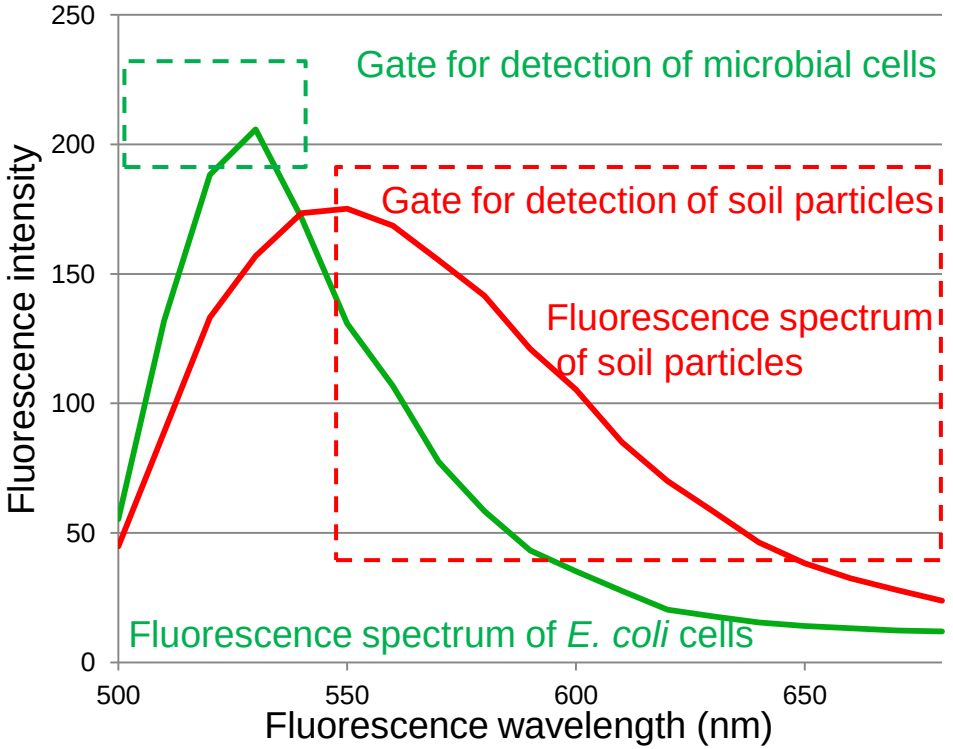

Supplementary Figure S1.

(a) Satellite image of severe Asian dust storm,12 Nov. 2010.

Source: http://rapidfire.sci.gsfc.nasa.gov/gallery/?20103161112/SeaofJapan.A2010316.0220.2km.jpg

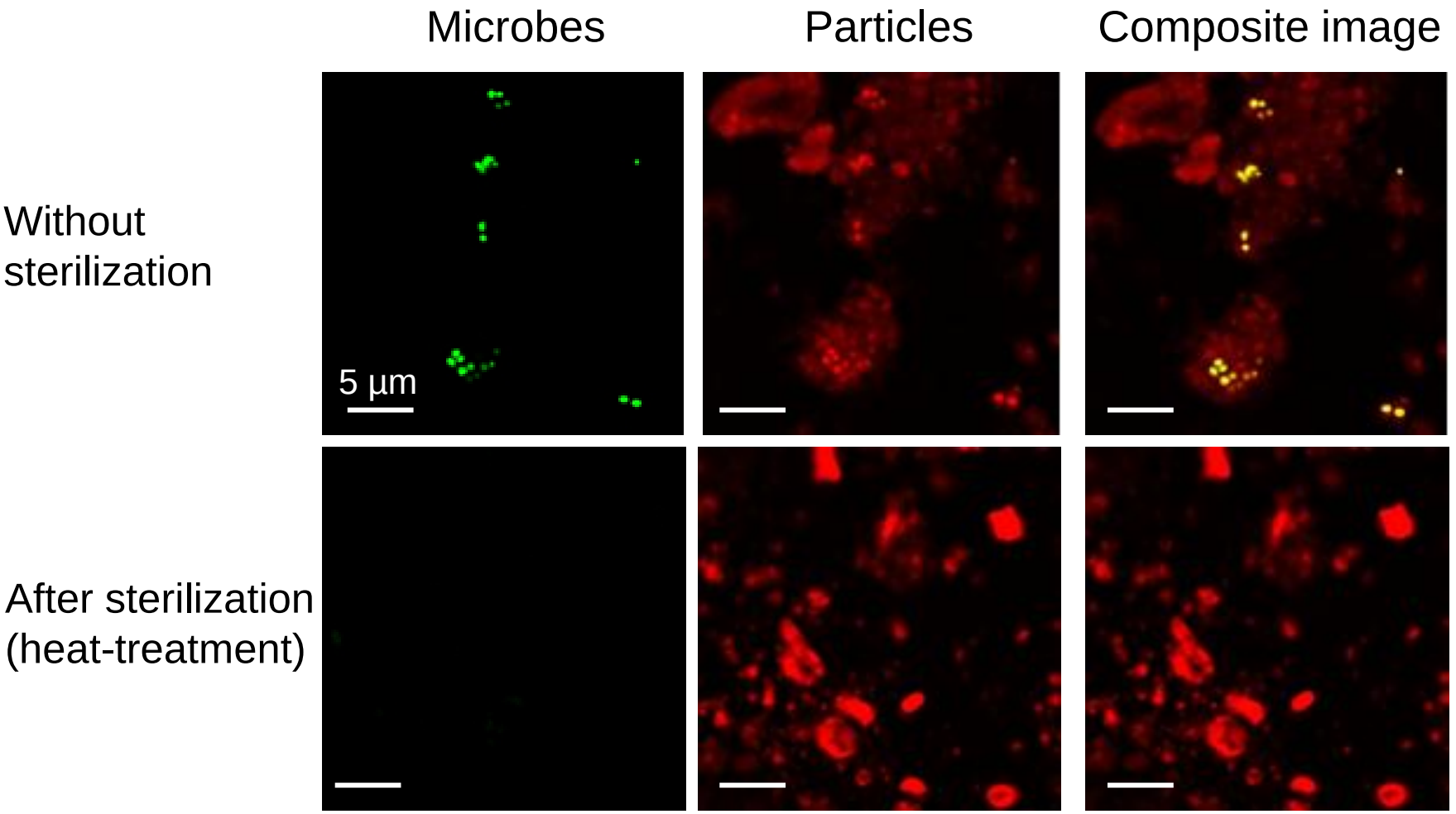
(b) Source region of Asian dust storm commencing 12 Nov. 2010 in Japan, estimated by backward trajectory analysis.



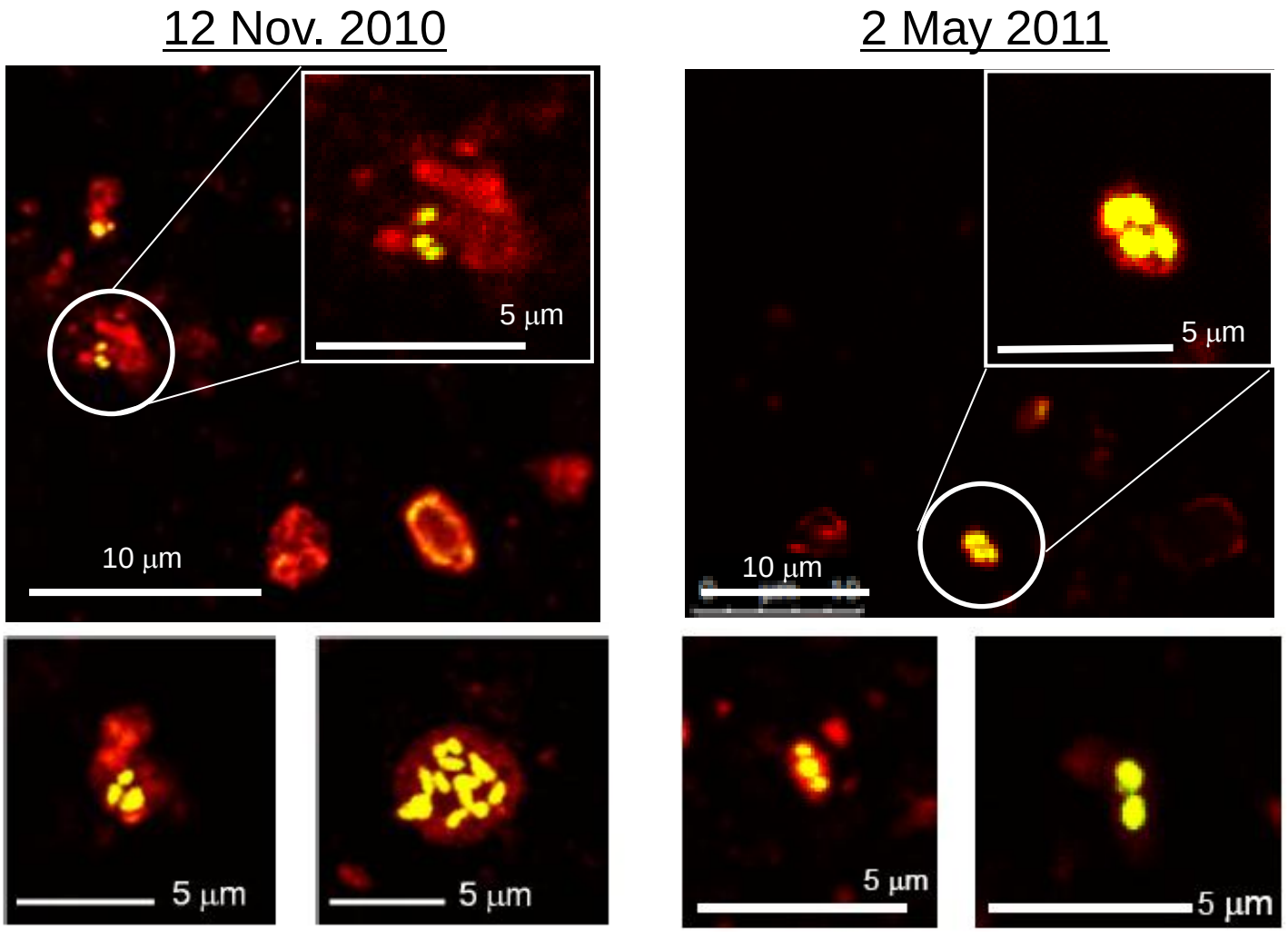




Supplementary Figure S2. Discrimination of bacterial cells from soil particles using the laser scanning microscope equipped with a microspectrophotometer.

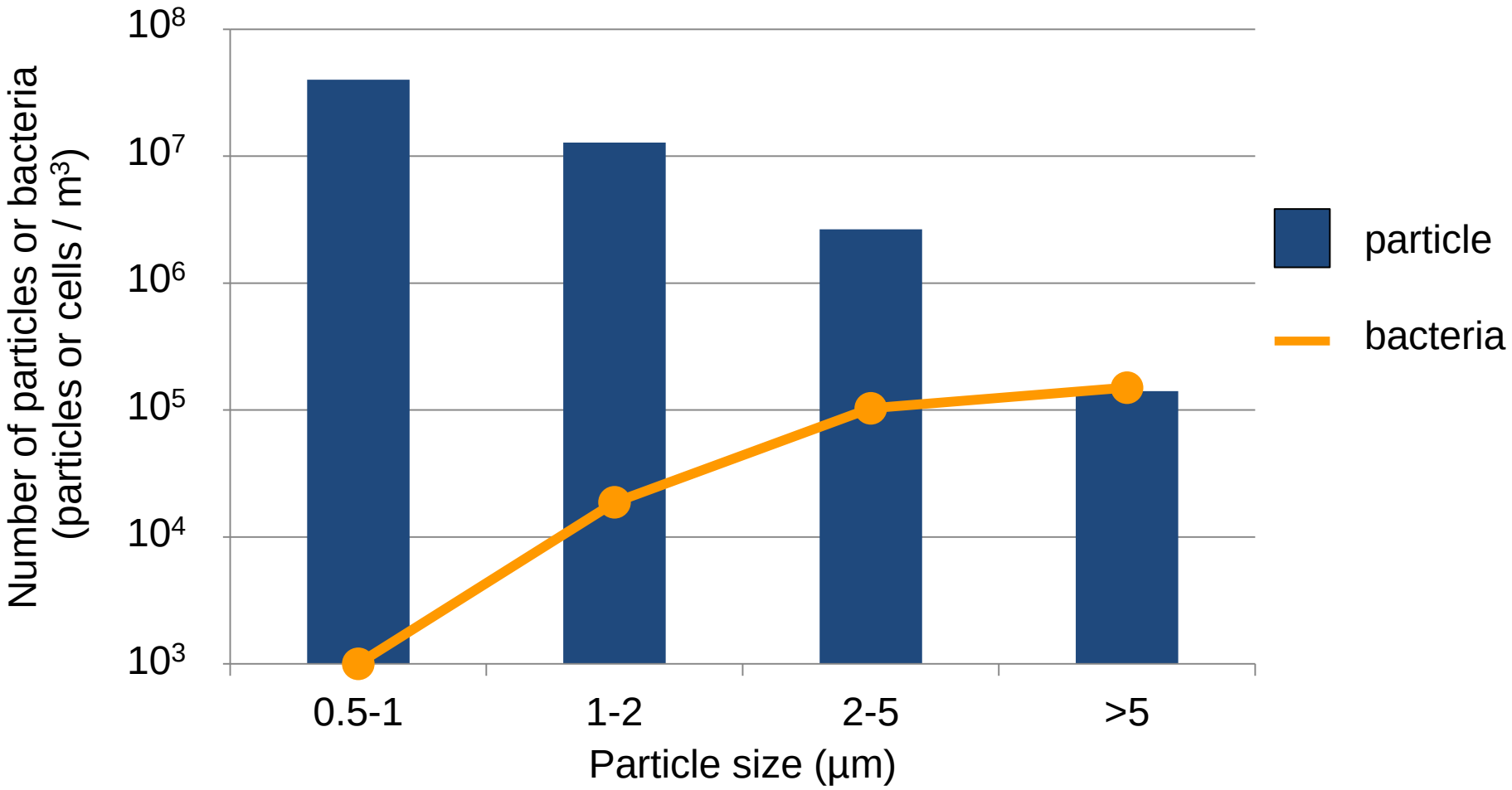
*E. coli* cells were inoculated in sterilized soil particles collected in the Asian dust source region (Loess Plateau) and fluorescently stained with SYBR Green I. Bacterial cells show green fluorescence and dust particles show yellow to red fluorescence, thus are easily distinguished from bacteria.



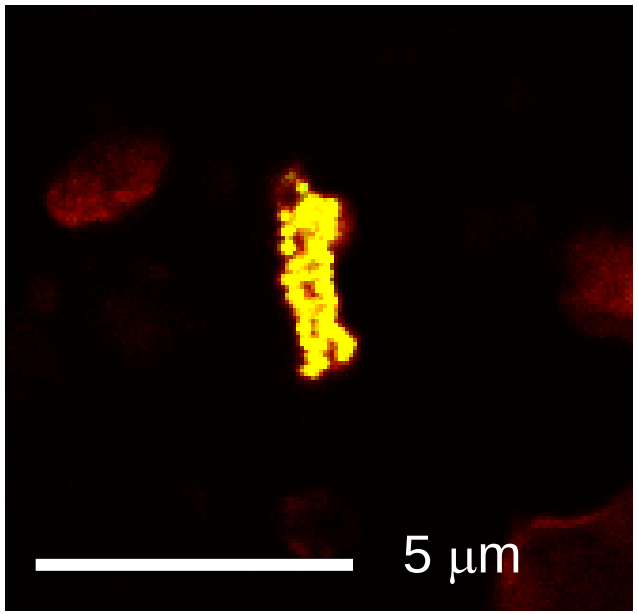

Supplementary Figure S3. Selective detection of bacterial cells on Asian dust particles by laser scanning microscopy. Asian dust particles collected in Beijing were fluorescently stained with SYBR Green I. Many microbial cells were observed under laser scanning microscope, while green fluorescence from bacterial cells disappeared after sterilization.

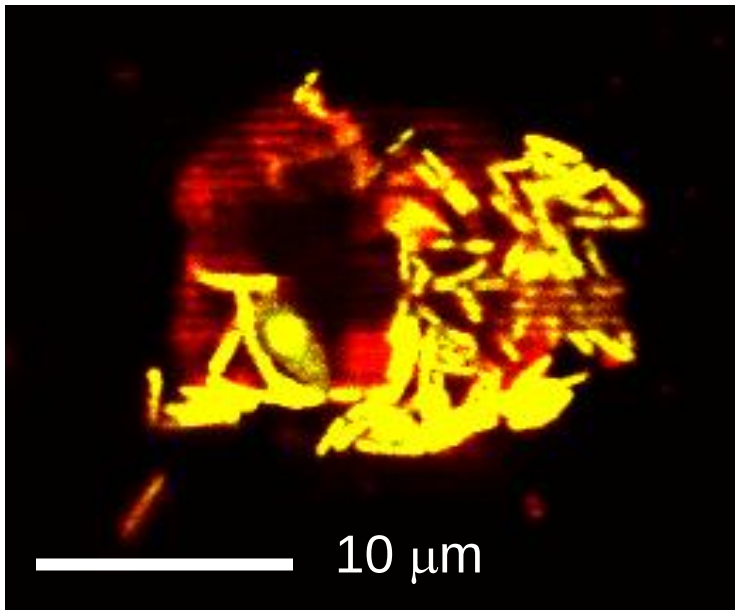



Supplementary Figure S4. Selective detection of microbial cells on an Asian dust particle (collected on 12 Nov. 2010 or 2 May 2011) by laser scanning microscopy.




Supplementary Figure S5. Bacterial number and size distribution of Asian dust particles collected on 12 Nov. 2011. Bacterial number was determined by laser scanning microscopy.




Supplementary Figure S6. Selective detection of microcolonies of microbial cells formed on an Asian dust particle (collected on 12 Nov. 2010) by laser scanning microscopy. Microcolonies were formed by incubation on standard method agar at 25˚C for 48 hours.

Supplementary Table S1. Sampling date and altitude, event severity, sampling volume, and bacterial abundance on Asian dust particles (determined by quantitative PCR of 16S rRNA gene).

| Sampling site | Sampling date | Sampling altitude (m) | Severity of Asian dust[a)] | Sampling volume (liter) | 16S rRNA gene (copies/$m^3$) | Estimated bacterial number (cells/$m^3$)[b)] |
|---|---|---|---|---|---|---|
| Japan Sea | 12 Nov., 2010 | 900 | ++ | 15,000 | $2 \times 10^5$ | $1 \times 10^4$ - $2 \times 10^5$ |
| | 13 Nov., 2010 | 900 | + | 12,000 | $8 \times 10^4$ | $5 \times 10^3$ - $8 \times 10^4$ |
| | 16 Nov., 2010 | 900 | - | 10,000 | $< 2 \times 10^3$ | $< 2 \times 10^3$ |

a) Severity of Asian dust was determined by METAR, SYNOP, LIDAR and pilot observation at sampling altitude.
b) Bacterial cells carry 1 to 15 copies of the 16S rRNA gene in their genome.