Supplement of Atmos. Chem. Phys., 22, 6435–6447, 2022
https://doi.org/10.5194/acp-22-6435-2022-supplement

Atmospheric Chemistry and Physics
Open Access

Supplement of

Mexican agricultural soil dust as a source of ice nucleating particles

Diana L. Pereira et al.

Correspondence to: Luis A. Ladino (luis.ladino@atmosfera.unam.mx)

Figures

Figures S2 and S3 were made from the T_{50} values of the different frozen fraction curves. The box plot figures contain information about the median T_{50}, the bottom and top edges of the box indicate the 25th and 75th percentiles. The whiskers represent the extreme data points and the red pluses the outlier values.

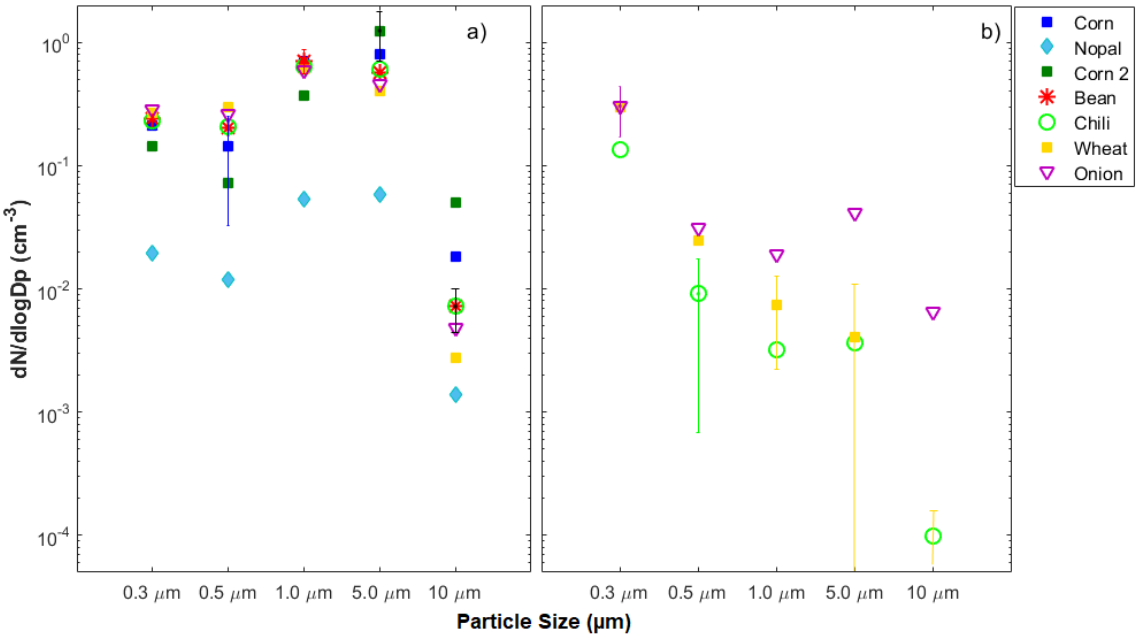

Figure S1: Particle size distribution for a) Laboratory samples, and b) Field samples. The symbols in colors show the mean values of the aerosol particle concentrations from the different soil samples, and the error bars represent the typical values of the standard deviation for each particle size.

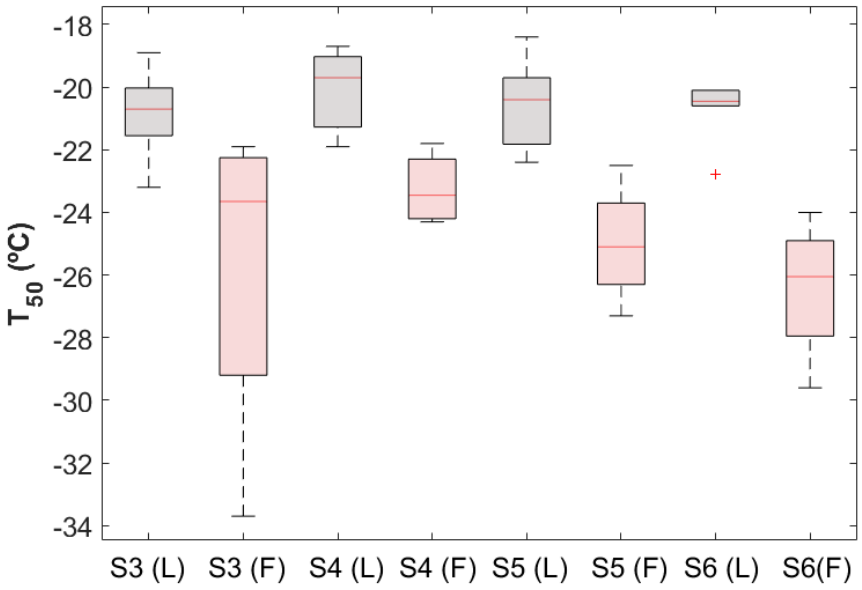

Figure S2: Average T_{50} of the Zacatecas aerosol samples collected at the field (F, red boxes) and those generated in the laboratory (L, grey boxes) for the Zacatecas soils samples for particles ranging between 3.2 and 5.6 µm (S3), 1.8 and 3.2 µm (S4), 1.0 and 1.8 µm (S5), and 0.56 and 1.0 µm (S6). The red cross indicates an outlier value of the T_{50}.

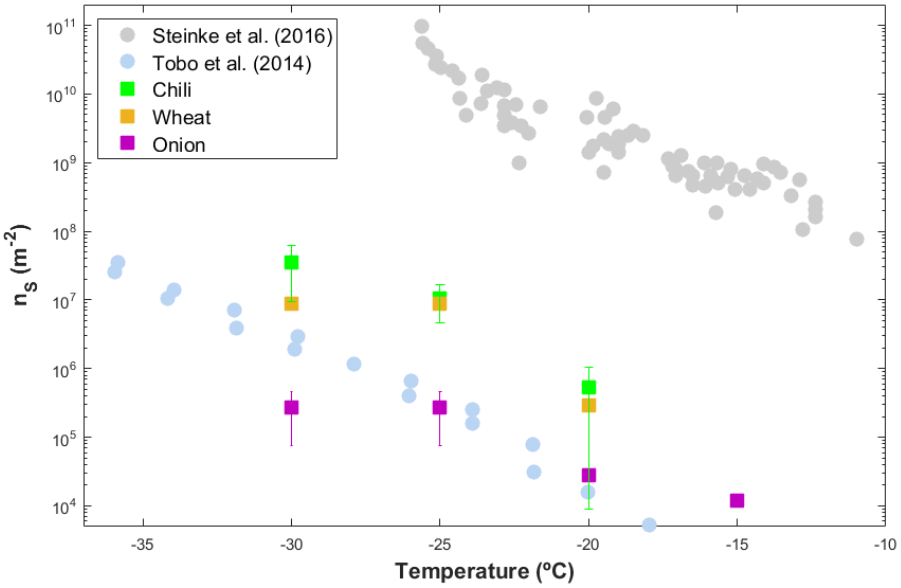

Figure S3: Ice nucleation active surface site (INAS) density (n_S) as a function of the temperature for aerosol particles collected during the Zacatecas field campaign. The error bars represent the standard deviation and the gray and blue soft circles show results from previous studies.

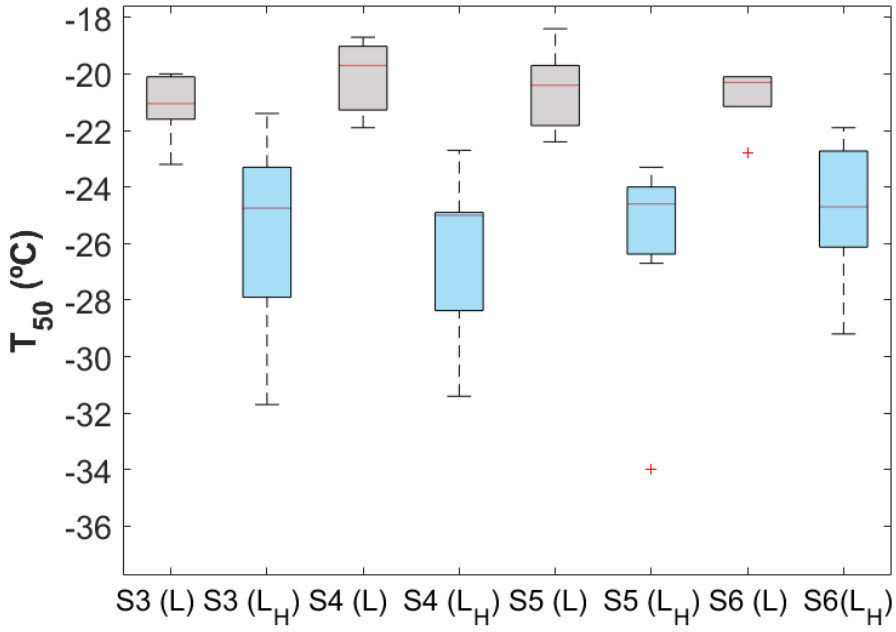

Figure S4: Average T_{50} for the Zacatecas agricultural dust particles generated in the laboratory (L) before (grey boxes) and after (blue boxes) the heating treatment for particle sizes ranging between 3.2 and 5.6 µm (S3), 1.8 and 3.2 µm (S4), 1.0 and 1.8 µm (S5), and 0.56 and 1.0 µm (S6). The heated samples are represented by the letter H. The red cross indicates an outlier value of the T_{50}. The corn sample data was excluded for S3, as well as the bean and chili samples data for S6.

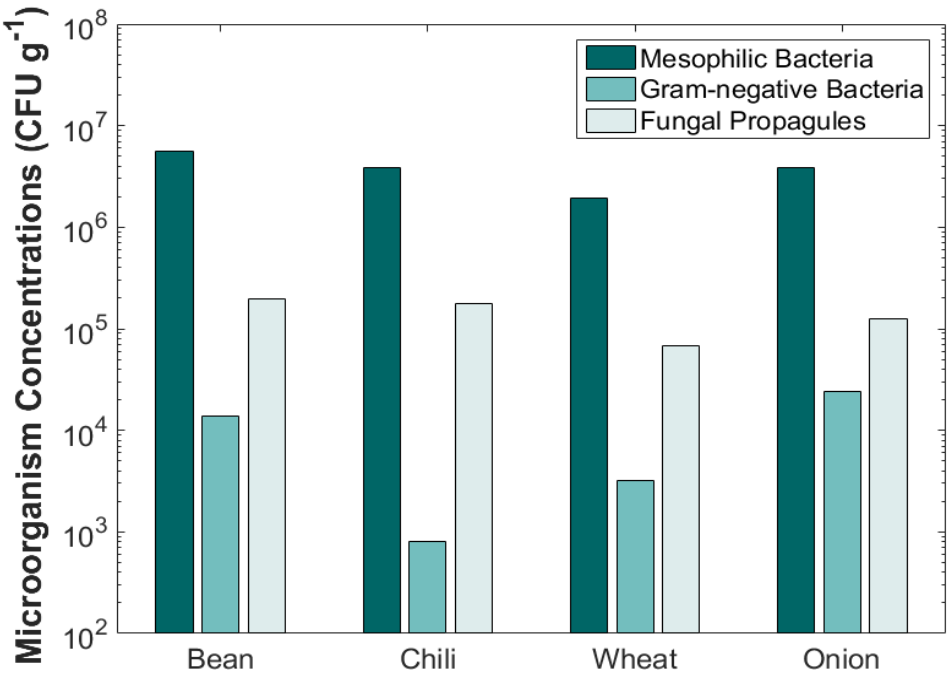

Figure S5: Concentration of microorganisms observed in soil samples collected in ZAC. Samples were cultured on Trypticase Soy Agar, MacConkey Agar, and Malt Extract Agar for mesophilic bacteria, gram-negative bacteria, and fungal propagules, respectively.

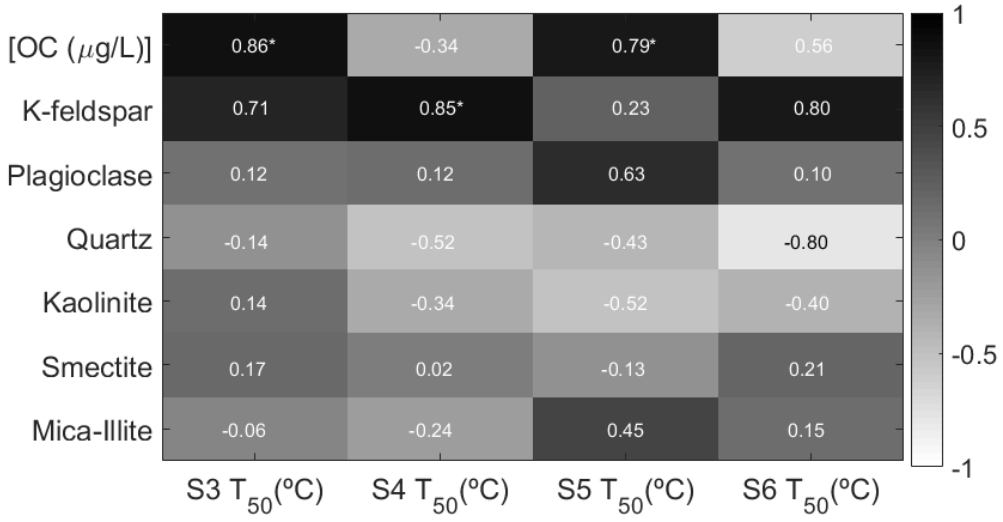

Figure S6: Correlation map between T_{50}, the concentration of the mineral phases, and the OC concentration for particle ranging between 3.2 and 5.6 µm (S3), 1.8 and 3.2 µm (S4), 1.0 and 1.8 µm (S5), and 0.56 and 1.0 µm (S6).

Table S1: Summary of the average meteorological conditions observed during the Zacatecas sampling campaign. The samples were collected between 4 h and 6 h.

Sample name	Date	Latitude/ Longitude	Temperature (°C)	Relative humidity (%)	Radiation W/m²	Wind speed (km/h)
Bean	24/02/2020	22.8050°N 102.6750°W	21.79	21.48	778.13	18.50
Chili	25/02/2020	22.8380°N 102.6853°W	16.52	36.80	483.32	12.64
Wheat	26/02/2020	22.8508°N 102.6476°W	16.10	20.22	760.41	15.67
Onion	27/02/2020	22.8164°N 102.6791°W	17.49	37.80	763.87	9.39

Table S2: Summary of the temperature shifts (ΔT_{50}) observed for the aerosol samples generated in the laboratory after the heat treatment. The results are reported for particles sizes ranging between 3.2 and 5.6 µm (S3), 1.8 and 3.2 µm (S4), 1.0 and 1.8 µm (S5), and 0.56 and 1.0 µm (S6).

	ΔT_{50} (ºC)			
Soil crop Sample	S3	S4	S5	S6
Corn	N/A	-7,6	-5,4	-4,6
Nopal	-5,9	-5,2	-3,7	-2,9
Corn 2	-11,7	-11,7	-14	-8,9
Bean	-1,9	-3	-6,3	N/A
Chili	-6,3	-9,6	-5	N/A
Wheat	-0,3	-3,2	-2,3	-2,3
Onion	-0,7	-4	-2,2	-1,3

N/A shows not available data as the heat samples were damaged during the experiments.