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Supporting Information:

2 Testing the performance of one and two box models as tools for risk assessment 3 of particle exposure during packing of inorganic fertilizer

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a) Small bags packing line

b) Small bags worker area instruments location

c) Big bags packing line and
worker area instruments location

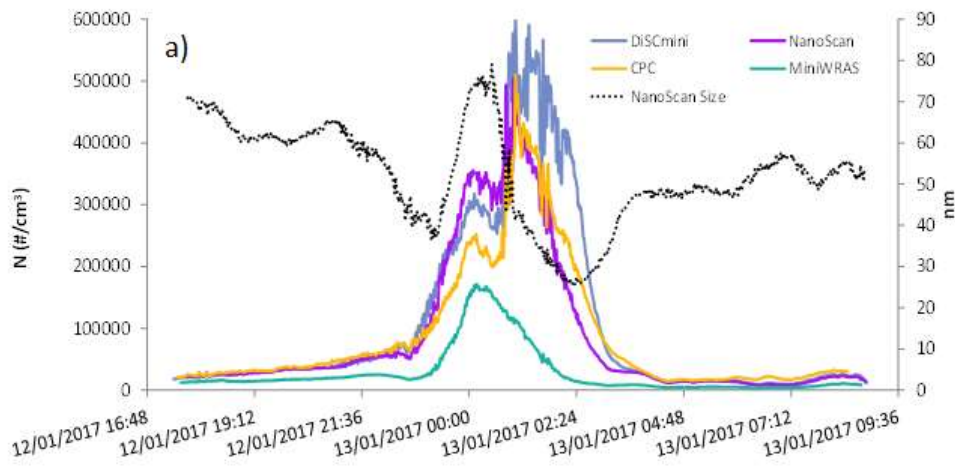
6 **Figure S1.** Images of the small and big bags packing lines plus instrument location.

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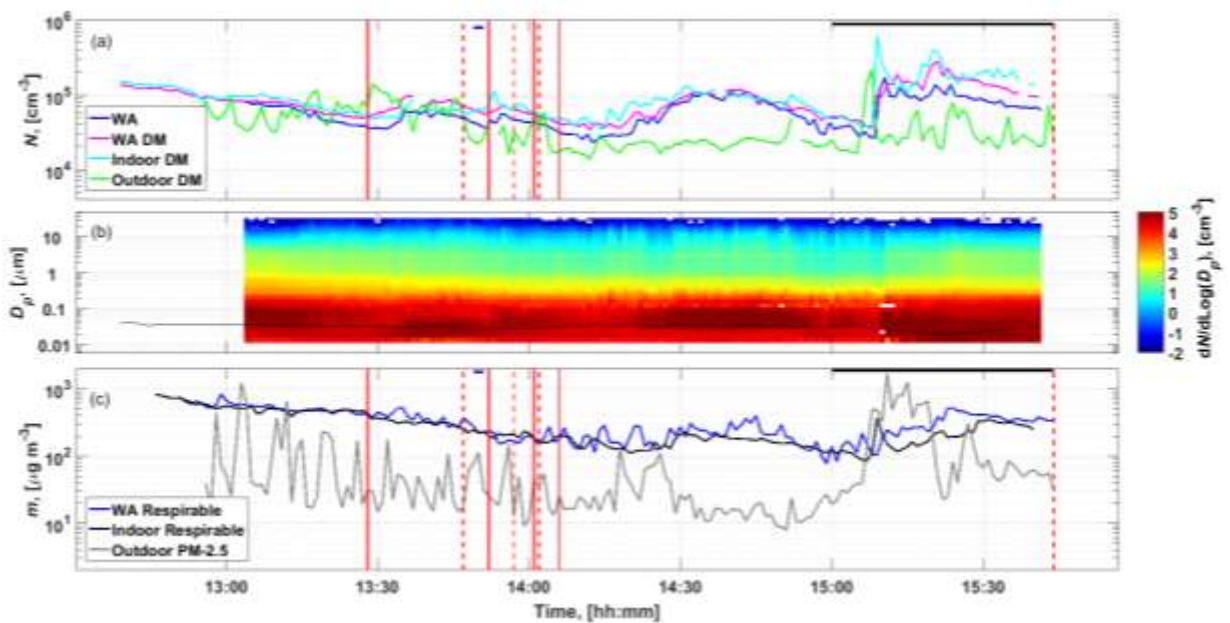
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12 **Figure S2.** DiSCmini, NanoScan, MiniWras and CPC number concentration during an intercomparison
 13 previous to the packing measurements. We can observe that the MiniWras, unlike CPC, NanoScan and
 14 DiSCmini cannot detect an increase of particles under 45-50 nm of diameter.

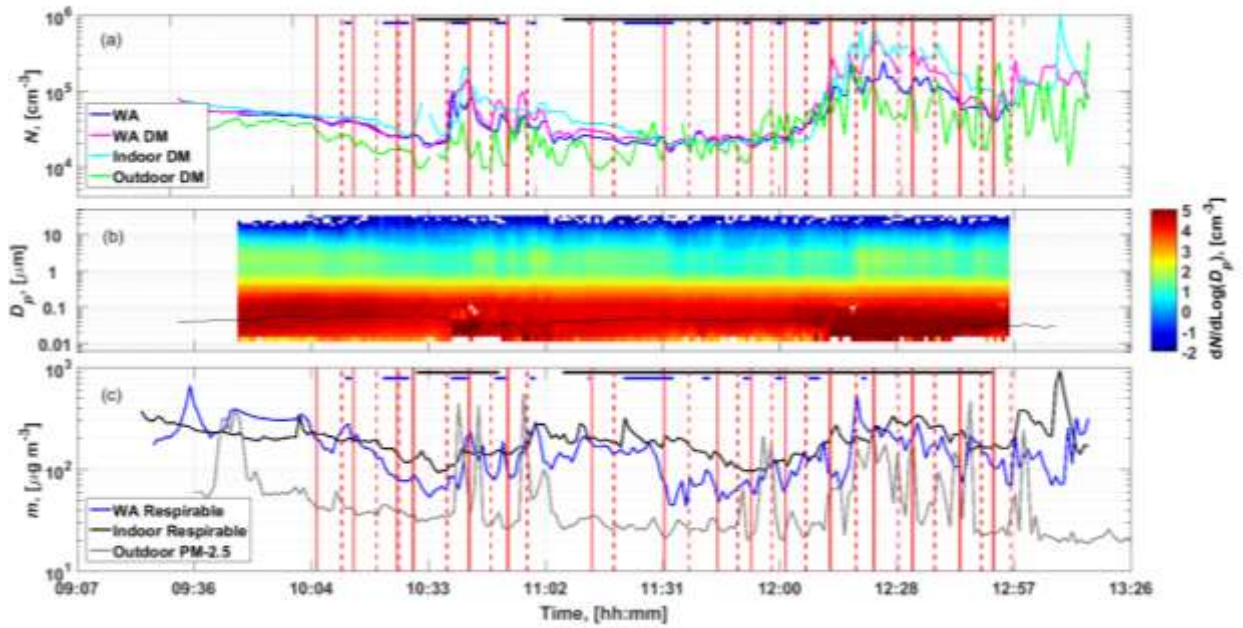
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17 **Figure S3.** Particle concentration in the packing area (WA) during small bags day 1 (SB1): (a) particle
 18 number concentration time series; (b) particle size distribution time series measured with the MiniWras and
 19 the NanoScan, solid black line shows DiSCmini (DM) D_{50} ; (c) mass concentration time series. Red vertical
 20 lines indicate start (solid line) and stop (dashed line) of the packing operation and horizontal black and
 21 blue lines on the top of the graphs indicate diesel and electric forklifts activity respectively.

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24 **Figure S4.** Particle concentration in the packing area (WA) during big bags day 2 (BB2): (a) particle
 25 number concentration time series; (b) particle size distribution time series measured with the MiniWras and
 26 the NanoScan, solid black line shows DiSCmini (DM) D_{50} ; (c) mass concentration time series. Red vertical
 27 lines in (a) and (c) indicate start (solid line) and stop (dashed line) of the packing operation and horizontal
 28 black and blue lines on the top of the graphs indicate diesel and electric forklifts activity respectively.

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30 **Table S1.** Mean number concentration and particle size for background (pre-activity) and packing process
 31 measured with the DiSCmini in the worker area, indoor and outdoor measurement locations. * NaN:
 32 information not available due to technical problems. Values in bold indicate a statistically significant
 33 differences compared with background concentrations.

Material	Process	Worker area (WA)		Indoor		Outdoor	
		Number (cm ⁻³)	Size (nm)	Number (cm ⁻³)	Size (nm)	Number (cm ⁻³)	Size (nm)
SB1	Background	115845	38	126803	43	52681	23
	Packing	72263	32	81903	37	39514	20
SB2	Background	130834	28	*NaN	*NaN	83865	31
	Packing	78200	37	*NaN	*NaN	77566	31
BB1	Background	145232	33	117211	38	86871	29
	Packing	113087	37	102988	43	103404	32
BB2	Background	-	-	-	-	-	-
	Packing	41955	44	45277	57	30512	43

34 **Table S2.** Mean particle mass concentration for background (pre-activity) and packing processes
 35 measured with the Grimm – mini LAS laser spectrometer in the indoors and outdoors locations. Values are
 36 in $\mu\text{g m}^{-3}$. Values in bold indicate a statistically significant differences compared with background
 37 concentrations.

Material	Process	Indoor			Outdoor		
		Inhalable	Thoracic	Respirable	PM-10	PM-2.5	PM-1
SB1	Background	2063	1630	706	1570	212	25
	Packing	1142	771	245	694	105	16
SB2	Background	1232	878	281	1303	111	23
	Packing	1599	1144	349	1114	118	24
BB1	Background	1537	1120	350	974	82	19
	Packing	1514	1269	549	1538	205	33
BB2	Background	-	-	-	-	-	-
	Packing	1171	902	339	624	150	31

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39 **Table S3.** Calculated dose rates in particle number, \dot{n} and mass, \dot{m} and regional deposition in percentages
 40 to head airways, trachea bronchi and alveolar regions.

	Day 1 - Small Bags 1		Day 2 - Small Bags 2		Day 3 - Big Bags 1		Day 4 - Big Bags 2	
	BG	Packing	BG	Packing	BG	Packing	BG	Packing
$\dot{n}_{10}^6 [\text{min}^{-1}]$	770	857	834	1035	882	1122	-	682
$\dot{n}_{\text{Head airways}} [\%]$	11.7	12.6	12.1	11.5	10.7	12.2	-	12.8
$\dot{n}_{\text{Trachea bronchi}} [\%]$	19.1	20.4	20.0	19.4	18.0	20.0	-	20.7
$\dot{n}_{\text{Alveolar}} [\%]$	69.2	67.0	68.0	69.1	71.3	67.8	-	66.6
$\dot{m}_{10}^{-3} [\text{ng min}^{-1}]$	24.0	22.1	20.1	26.4	21.7	40.4	-	10.0
$\dot{m}_{\text{Head airways}} [\%]$	90.8	93.5	92.0	92.4	89.0	91.0	-	91.6
$\dot{m}_{\text{Trachea bronchi}} [\%]$	3.6	2.6	3.3	3.1	4.3	3.6	-	3.3
$\dot{m}_{\text{Alveolar}} [\%]$	5.7	3.9	4.8	4.5	6.7	5.4	-	5.1

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