

Modeling and Assessment of PM₁₀ and Atmospheric Metal Pollution in Kayseri Province, Turkey

Fatma Kunt ^{1*}, Zeynep Cansu Ayturan ², Feray Yümün ³, İlknur Karagönen ³, Mümin Semerci ³, Mehmet Akgün ³ and İbrahim Ceylan ³

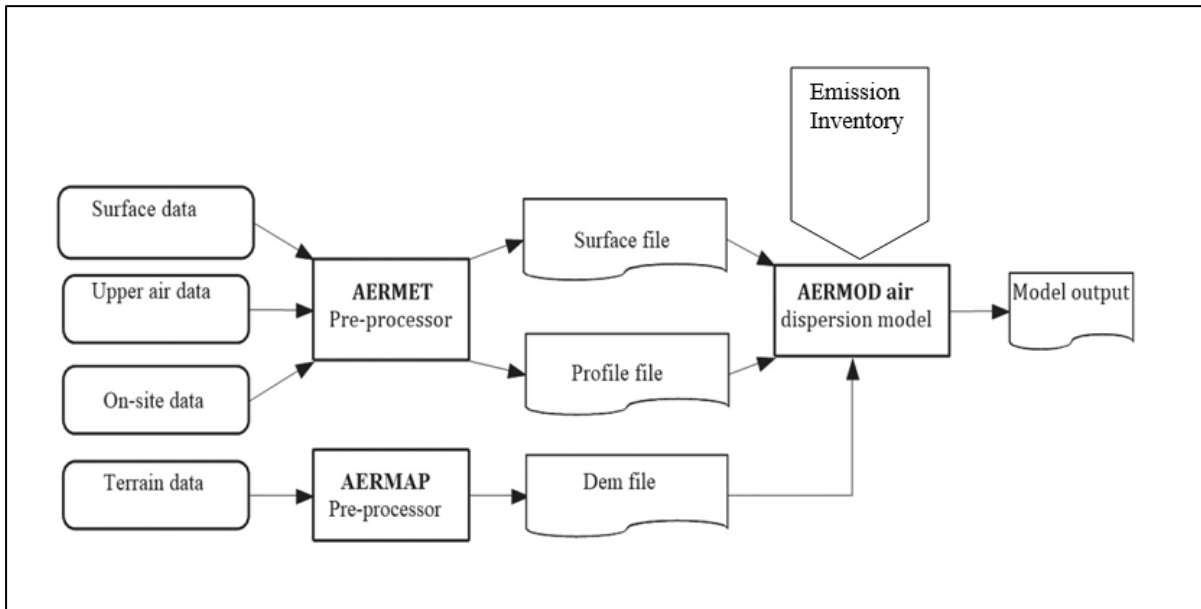


Figure S1. AERMOD data flow chart.

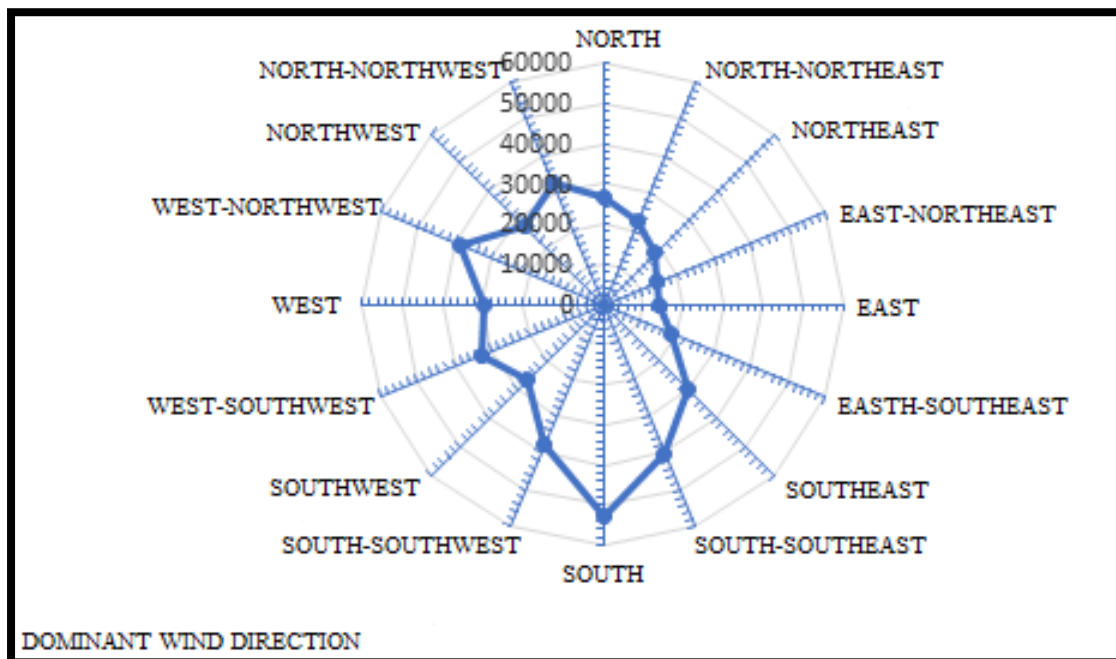


Figure S2. Wind rose showing dominant wind direction prepared from the meteorological data between 1960–2015.

Table S1. The points used in AERMOD scenarios and their sectors.

Facility	Type	ID	Sector	All Scenario	Scenario 1	Scenario 2
1	Point	PATEKS	Paper Recovery	X	X	
2	Point	BOYTAS	Furniture	X	X	
3	Point	BOYTEKS	Textile	X	X	
4	Point	ÇINKOM	Zinc Production	X		X
5	Point	SERSİM	Machine Production	X	X	
6	Point	KAYDÖKSAN	Casting	X	X	
7	Point	KAYSERISEKE1	Sugar Production	X		X
	Point	KAYSERISEKE2		X		X
	Point	KAYSERISEKE3		X		X
8	Point	DORUK	Machine Production	X	X	
9	Point	ÇAGLAYAN	Casting	X	X	
10	Point	FEMAŞ	Machine Production	X	X	
11	Point	ŞIRIKOGLU	Textile	X	X	
12	Point	SIMKA	Casting	X	X	
13	Point	SOMCELİK	Metal Working	X	X	
14	Point	MINISAN	Household Appliances	X	X	
15	Point	ERBOSAN	Pipe Manufacturing	X	X	
16	Point	KUMTEL	Household Appliances	X	X	
17	Point	MESTAS	Metal Working	X	X	
18	Point	REFORM	Textile	X	X	
19	Point	HES	Wire Production	X	X	
20	Point	BKBMOBİLYA	Furniture	X	X	

Table S2. Limit values for heavy metal pollution

Pollutant	Averaging Period	Limit Value
Lead	1 year	0.5 µg/m ³
Nickel	1 year	20 ng/m ³
Arsenic	1 year	6 ng/m ³
Cadmium	1 year	5 ng/m ³

Table S3. The PM10 emission rates (kg/h) for each point source.

Facility	Type	ID	Sector	PM ₁₀ Emission Rates (kg/h)
1	Point	PATEKS	Paper Recovery	2.114856
2	Point	BOYTAS	Furniture	0.10728
3	Point	BOYTEKS	Textile	0.027468
4	Point	ÇINKOM	Zinc Production	1.9584
5	Point	SERSİM	Machine Production	0.9252
6	Point	KAYDÖKSAN	Casting	0.7776
7	Point	KAYSERISEKE1	Sugar Production	0.054
	Point	KAYSERISEKE2		0.0396
	Point	KAYSERISEKE3		0.04176
8	Point	DORUK	Machine Production	0.05868
9	Point	ÇAGLAYAN	Casting	0.09
10	Point	FEMAŞ	Machine Production	0.414
11	Point	ŞIRIKOGLU	Textile	0.04068
12	Point	SIMKA	Casting	0.315
13	Point	SOMCELIK	Metal Working	0.3636
14	Point	MINISAN	Household Appliances	0.02556
15	Point	ERBOSAN	Pipe Manufacturing	0.54
16	Point	KUMTEL	Household Appliances	0.36
17	Point	MESTAS	Metal Working	0.0648
18	Point	REFORM	Textile	0.03276
19	Point	HES	Wire Production	0.864
20	Point	BKBMOBILYA	Furniture	0.32868

Table S4. Meteorology pathway of the AERMOD models

Meteorology Pathway

AERI

Met Input Data

Surface Met Data

Filename: ..\kayserimet.SFC


Format Type: Default AERMET format

Profile Met Data

Filename: ..\kayserimet.PFL

Format Type: Default AERMET format

Wind Speed



Wind Speeds are Vector Mean (Not Scalar Means)

Wind Direction

Rotation Adjustment [deg]:

Potential Temperature Profile

Base Elevation above MSL (for Primary Met Tower): 10.00 [m]

Meteorological Station Data

Stations	Station No.	Year	X Coordinate [m]	Y Coordinate [m]	Station Name
Surface		2014			ERKILET_LTAU_[Sinoptik]_[Metar]_
Upper Air		2014			ERKILET_LTAU_[Sinoptik]_[Metar]_

Data Period

Data Period to Process

Start Date: 1/1/2014 Start Hour: 1 End Date: 12/31/2014 End Hour: 24

Wind Speed Categories

Stability Category	Wind Speed [m/s]	Stability Category	Wind Speed [m/s]
A	1.54	D	8.23
B	3.09	E	10.8
C	5.14	F	No Upper Bound