Supporting Information for

Improved atmospheric modelling of the oasis-desert system in Central Asia using WRF with actual satellite products

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Table S1. shows LU types and codes of for the 2012LU.

First level code	categories	Sub-level code	Subcategories
1	Cropland	11	Irrigated crops (rice, lotus and other aquatic crops)
		12	Non-irrigated crops (rainfed croplands)
2	Forestland	21	Closed(>30%)natural and artificial forests
		22	Closed(>40%) Shrub
		23	Closed(10%~30%) woodland
		24	Other woodland (orchards, mulberry)
3	Grassland	31	closed (>50%) grassland
		32	Closed- to-open 20%~50% grassland
		33	Open 5%~20% grassland
4	Water and Wetland	41	Rivers and canals
		42	Lakes
		43	Reservoir ponds
		44	Snow and ice
		45	Intertidal
		46	Floodplain
5	Settlements	51	Cities and towns
		51	Villages
		53	Other construction lands
6	Others	61	Sandy land
		62	Gobi
		63	Saline
		64	Marsh
		65	Bare
		66	Bare rock
		67	others

Table S2. Land use type and its categories for WRF and the 2012LU

Land use type	WRF	2013LU
Urban and Built-Up Land	1	51
Dryland Cropland and Pasture	2	
Irrigated Cropland and Pasture	3	11, 12, 52, 21 (if DEM < 1,500)
Mixed Dryland/Irrigated Cropland and Pasture	4	
Cropland/Grassland Mosaic	5	
Cropland/Woodland Mosaic	6	
Grassland	7	31 (if DEM ≥ 1,000), 32 (if DEM ≥ 1,000), 33 (if DEM ≥ 1,000)
Shrubland	8	23, 22 (if DEM < 1,500)
Mixed Shrubland/Grassland	9	
Savanna	10	
Deciduous Broadleaf Forest	11	
Deciduous Needleleaf Forest	12	
Evergreen Broadleaf Forest	13	
Evergreen Needleleaf Forest	14	21 (if DEM ≥ 1,500), 22 (if DEM ≥ 1,500)
Mixed Forest	15	
Water Bodies	16	41, 42, 43, 46,
Herbaceous Wetland	17	
Wooded Wetland	18	
Barren or Sparsely Vegetated	19	61, 62, 63, 65, 67, 66 (if DEM < 3,400), 31 (if DEM < 1,000), 32 (if DEM< 1,000), 33 (if DEM < 1,000)
Herbaceous Tundra	20	
Wooded Tundra	21	
Mixed Tundra	22	
Bare Ground Tundra	23	66 (if DEM ≥ 3,400)
Snow or Ice	24	44

Land use type of the 2012LU can be seen in Table S1

Because the 2012LU uses a hierarchical classification system at a spatial resolution of 30 m, it was converted into the USGS classification system according to the corresponding relations in **Table S2** and then upscaled to land use at 1 km by employing a majority resampling technique. There were 9 land use types in the study area (shown in italic **Table S2)**.