

We were unable to submit our code as a netlogo3D file, but it can be copied into netlogo3D on your end. Please still consider this as an Agent Based Modeling/Netlogo Model submissions.

```
Extensions [  
  profiler  
]
```

```
Patches-own [  
  Surface TiO2  
  w-direction w-speed  
  s-close  
  smog nsmog  
  temp smog  
  Restriction  
  strue tcount  
  s-temp d-temp  
]
```

```
Globals [  
  osmog scount  
]
```

```
Breed [  
  sun  
]
```

```
to Setup  
  clear-all  
  reset-ticks  
  ask patches [  
    set restriction (count neighbors6 with [surface = true])  
  ]  
  run [  
    Roads  
    Buildings  
    Placement  
    Wind-set  
  ]  
  repeat world-width [  
    run [  
      ask patches [  
        ask surface of patch 0 0  
        ask surface of patch 1 0  
        ask surface of patch 2 0  
        ask surface of patch 3 0  
        ask surface of patch 4 0  
        ask surface of patch 5 0  
        ask surface of patch 6 0  
        ask surface of patch 7 0  
        ask surface of patch 8 0  
        ask surface of patch 9 0  
        ask surface of patch 10 0  
        ask surface of patch 11 0  
        ask surface of patch 12 0  
        ask surface of patch 13 0  
        ask surface of patch 14 0  
        ask surface of patch 15 0  
        ask surface of patch 16 0  
        ask surface of patch 17 0  
        ask surface of patch 18 0  
        ask surface of patch 19 0  
        ask surface of patch 20 0  
        ask surface of patch 21 0  
        ask surface of patch 22 0  
        ask surface of patch 23 0  
        ask surface of patch 24 0  
        ask surface of patch 25 0  
        ask surface of patch 26 0  
        ask surface of patch 27 0  
        ask surface of patch 28 0  
        ask surface of patch 29 0  
        ask surface of patch 30 0  
        ask surface of patch 31 0  
        ask surface of patch 32 0  
        ask surface of patch 33 0  
        ask surface of patch 34 0  
        ask surface of patch 35 0  
        ask surface of patch 36 0  
        ask surface of patch 37 0  
        ask surface of patch 38 0  
        ask surface of patch 39 0  
        ask surface of patch 40 0  
        ask surface of patch 41 0  
        ask surface of patch 42 0  
        ask surface of patch 43 0  
        ask surface of patch 44 0  
        ask surface of patch 45 0  
        ask surface of patch 46 0  
        ask surface of patch 47 0  
        ask surface of patch 48 0  
        ask surface of patch 49 0  
        ask surface of patch 50 0  
        ask surface of patch 51 0  
        ask surface of patch 52 0  
        ask surface of patch 53 0  
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        ask surface of patch 56 0  
        ask surface of patch 57 0  
        ask surface of patch 58 0  
        ask surface of patch 59 0  
        ask surface of patch 60 0  
        ask surface of patch 61 0  
        ask surface of patch 62 0  
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        ask surface of patch 67 0  
        ask surface of patch 68 0  
        ask surface of patch 69 0  
        ask surface of patch 70 0  
        ask surface of patch 71 0  
        ask surface of patch 72 0  
        ask surface of patch 73 0  
        ask surface of patch 74 0  
        ask surface of patch 75 0  
        ask surface of patch 76 0  
        ask surface of patch 77 0  
        ask surface of patch 78 0  
        ask surface of patch 79 0  
        ask surface of patch 80 0  
        ask surface of patch 81 0  
        ask surface of patch 82 0  
        ask surface of patch 83 0  
        ask surface of patch 84 0  
        ask surface of patch 85 0  
        ask surface of patch 86 0  
        ask surface of patch 87 0  
        ask surface of patch 88 0  
        ask surface of patch 89 0  
        ask surface of patch 90 0  
        ask surface of patch 91 0  
        ask surface of patch 92 0  
        ask surface of patch 93 0  
        ask surface of patch 94 0  
        ask surface of patch 95 0  
        ask surface of patch 96 0  
        ask surface of patch 97 0  
        ask surface of patch 98 0  
        ask surface of patch 99 0  
      ]  
    ]  
  ]  
end
```

```

        Direction-set
    ]
]
run [
    sclose
]
ask patches [
    if count neighbors4 with [pcolor = grey and surface = true] = 4 and pzcor = 0 [
        ask patch [pxcor] of self [pycor] of self ([pzcor] of self + 1) [
            set smog 100
        ]
    ]
]
end

```

```

to Simulate
    run [
        Sunlight
        Diffusion
        Removal
    ]
    if ticks = 66 [
        stop
    ]
end

```

```

to Roads
    ask patches [
        if pzcor = 0 [
            set pcolor green
            set surface true
        ]
        if pzcor = 0 and pycor >= -1 and pycor <= 1 [
            set pcolor grey
        ]
        if pzcor = 0 and pycor >= 39 and pycor <= 41 [
            set pcolor grey
        ]
        if pzcor = 0 and pycor <= -39 and pycor >= -41 [
            set pcolor grey
        ]
        if pzcor = 0 and (pycor = 79 or pycor = 80 or pycor = -79 or pycor = -80) [
            set pcolor grey
        ]
    ]
end

```

```

    if pzcor = 0 and pxcor >= -1 and pxcor <= 1 [
      set pcolor grey
    ]
    if pzcor = 0 and pxcor >= 37 and pxcor <= 39 [
      set pcolor grey
    ]
    if pzcor = 0 and pxcor <= -37 and pxcor >= -39 [
      set pcolor grey
    ]
    if pzcor = 0 and (pxcor = 75 or pxcor = 76 or pxcor = -75 or pxcor = -76) [
      set pcolor grey
    ]
  ]
end

```

to Buildings

```

ask patches [
  if pzcor <= 22 [
    if (pxcor > 20 and pxcor < 36) and (pycor > 21 and pycor < 38) [
      set pcolor grey
      set surface true
    ]
  ]
  if pzcor <= 18 [
    if (pxcor > 2 and pxcor < 19) and (pycor > 2 and pycor < 20) [
      set pcolor grey
      set surface true
    ]
  ]
  if pzcor <= 14 [
    if (pxcor > -36 and pxcor < -20) and (pycor > -78 and pycor < -42) [
      set pcolor grey
      set surface true
    ]
  ]
  if pzcor <= 12 [
    if (pxcor > -25 and pxcor < -14) and (pycor > -38 and pycor < -2) [
      set pcolor grey
      set surface true
    ]
  ]
  if pzcor <= 10 [
    if (pxcor > 40 and pxcor < 57) and (pycor > 61 and pycor < 78) [
      set pcolor grey
    ]
  ]
]

```

```

        set surface true
    ]
]
if pzc<= 8 [
    if (pxcor > -36 and pxcor < -25) and (pycor > -38 and pycor < -2) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 58 and pxcor < 74) and (pycor > 42 and pycor < 60) [
        set pcolor grey
        set surface true
    ]
]
if pzc<= 7 [
    if (pxcor > 40 and pxcor < 57) and (pycor > 42 and pycor < 60) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 2 and pxcor < 36) and (pycor >= -20 and pycor < -2) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 2 and pxcor < 19) and (pycor > -38 and pycor <= -21) [
        set pcolor grey
        set surface true
    ]
]
if pzc<= 6 [
    if (pxcor > 40 and pxcor < 57) and (pycor > 2 and pycor < 38) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 2 and pxcor <= 13) and (pycor > 42 and pycor < 78) [
        set pcolor grey
        set surface true
    ]
    if (pxcor >= 14 and pxcor <= 24) and (pycor > 42 and pycor < 60) [
        set pcolor grey
        set surface true
    ]
    if (pxcor >= 25 and pxcor < 36) and (pycor > 42 and pycor < 78) [
        set pcolor grey
        set surface true
    ]
]

```

```

]
if pzcor <= 5 [
    if (pxcor > -14 and pxcor < -2) and (pycor > -38 and pycor < -2) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 40 and pxcor < 57) and (pycor > -38 and pycor < -2) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 40 and pxcor < 57) and (pycor > -60 and pycor < -42) [
        set pcolor grey
        set surface true
    ]
]
]
if pzcor <= 4 [
    if (pxcor > -36 and pxcor < -2) and (pycor > 42 and pycor < 78) [
        set pcolor grey
        set surface true
    ]
]
]
if pzcor <= 3 [
    if (pxcor > 20 and pxcor < 36) and (pycor > -78 and pycor < -42) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 58 and pxcor < 74) and (pycor > -60 and pycor < -42) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 58 and pxcor < 74) and (pycor > 2 and pycor < 20) [
        set pcolor grey
        set surface true
    ]
]
]
if pzcor <= 2 [
    if (pxcor > -19 and pxcor < -2) and (pycor > -60 and pycor < -42) [
        set pcolor grey
        set surface true
    ]
    if (pxcor > 58 and pxcor < 74) and (pycor > 21 and pycor < 38) [
        set pcolor grey
        set surface true
    ]
]
]

```

```

        if (pxcor > 58 and pxcor < 74) and (pycor > -38 and pycor < -2) [
            set pcolor grey
            set surface true
        ]
    ]
end

```

to Placement

```

ask patches [
    if Material = "Bottom" [
        if pzcor <= 2 and pzcor > 0 [
            set pcolor white
            set TiO2 true
        ]
    ]
    if Material = "Middle" [
        if pzcor > 2 and pzcor <= 4 [
            set pcolor white
            set TiO2 true
        ]
    ]
    if Material = "Top" [
        if pzcor > 4 and pzcor <= 22 [
            set pcolor white
            set TiO2 true
        ]
    ]
    if Material = "Full" [
        if pzcor <= 22 and pzcor != 0 [
            set pcolor white
            set TiO2 true
        ]
    ]
]
end

```

To Wind-set

```

if Direction-O = "South" [
    ask patches with [pycor = min-pycor and surface != true] [
        set w-direction 3
    ]
]
if Direction-O = "North" [

```

```

    ask patches with [pycor = max-pycor and surface != true] [
      set w-direction 4
    ]
  ]
  if Direction-O = "West" [
    ask patches with [pxcor = min-pxcor and surface != true] [
      set w-direction 2
    ]
  ]
  if Direction-O = "East" [
    ask patches with [pxcor = max-pxcor and surface != true] [
      set w-direction 5
    ]
  ]
]
end

to Direction-set
  ask patches with [surface != true] [
    if Direction-O = "South" [
      if w-direction = 3 [
        ask patch [pxcor] of self ([pycor] of self + 1) [pzcor] of self [
          if surface != true [
            set w-direction 3
          ]
          if [surface] of (patch [pxcor] of self ([pycor] of self + 1) [pzcor] of self) = true [
            set w-direction 6
          ]
        ]
      ]
      if [surface] of (patch ([pxcor] of self - 1) ([pycor] of self - 1) [pzcor] of self) = true and
        (count neighbors4 with [surface = true]) = 0 [
        ask patch ([pxcor] of self - 1) ([pycor] of self) [pzcor] of self [
          set w-direction 5
        ]
      ]
      if [surface] of (patch ([pxcor] of self + 1) ([pycor] of self - 1) [pzcor] of self) = true and
        (count neighbors4 with [surface = true]) = 0 [
        ask patch ([pxcor] of self + 1) ([pycor] of self) [pzcor] of self [
          set w-direction 2
        ]
      ]
    ]
    if w-direction = 6 [
      ask patch [pxcor] of self [pycor] of self ([pzcor] of self - 1) [
        if surface != true [

```

```

        set w-direction 6
    ]
]
]
]
if Direction-O = "North" [
    if w-direction = 4 [
        ask patch [pxcor] of self ([pycor] of self - 1) [pzcor] of self [
            if surface != true [
                set w-direction 4
            ]
            if [surface] of (patch [pxcor] of self ([pycor] of self - 1) [pzcor] of self) = true [
                set w-direction 6
            ]
        ]
    ]
    if [surface] of (patch ([pxcor] of self - 1) ([pycor] of self + 1) [pzcor] of self) = true and
(count neighbors4 with [surface = true]) = 0 [
        ask patch ([pxcor] of self - 1) ([pycor] of self) [pzcor] of self [
            set w-direction 5
        ]
    ]
    if [surface] of (patch ([pxcor] of self + 1) ([pycor] of self + 1) [pzcor] of self) = true and
(count neighbors4 with [surface = true]) = 0 [
        ask patch ([pxcor] of self + 1) ([pycor] of self) [pzcor] of self [
            set w-direction 2
        ]
    ]
    if w-direction = 6 [
        ask patch [pxcor] of self [pycor] of self ([pzcor] of self - 1) [
            if surface != true [
                set w-direction 6
            ]
        ]
    ]
]
]
if Direction-O = "West" [
    if w-direction = 2 [
        ask patch ([pxcor] of self + 1) [pycor] of self [pzcor] of self [
            if surface != true [
                set w-direction 2
            ]
        ]
        if [surface] of (patch ([pxcor] of self + 1) [pycor] of self [pzcor] of self) = true [
            set w-direction 6
        ]
    ]
]

```

```

    ]
  ]
]
if [surface] of (patch ([pxcor] of self - 1) ([pycor] of self - 1) [pzcor] of self) = true and
(count neighbors4 with [surface = true]) = 0 [
  ask patch ([pxcor] of self) ([pycor] of self - 1) [pzcor] of self [
    set w-direction 4
  ]
]
if [surface] of (patch ([pxcor] of self - 1) ([pycor] of self + 1) [pzcor] of self) = true and
(count neighbors4 with [surface = true]) = 0 [
  ask patch ([pxcor] of self) ([pycor] of self + 1) [pzcor] of self [
    set w-direction 3
  ]
]
if w-direction = 6 [
  ask patch [pxcor] of self [pycor] of self ([pzcor] of self - 1) [
    if surface != true [
      set w-direction 6
    ]
  ]
]
]
]
if Direction-O = "East" [
  if w-direction = 5 [
    ask patch ([pxcor] of self - 1) [pycor] of self [pzcor] of self [
      if surface != true [
        set w-direction 5
      ]
      if [surface] of (patch ([pxcor] of self - 1) [pycor] of self [pzcor] of self) = true [
        set w-direction 6
      ]
    ]
  ]
]
if [surface] of (patch ([pxcor] of self + 1) ([pycor] of self - 1) [pzcor] of self) = true and
(count neighbors4 with [surface = true]) = 0 [
  ask patch ([pxcor] of self) ([pycor] of self - 1) [pzcor] of self [
    set w-direction 4
  ]
]
if [surface] of (patch ([pxcor] of self + 1) ([pycor] of self + 1) [pzcor] of self) = true and
(count neighbors4 with [surface = true]) = 0 [
  ask patch ([pxcor] of self) ([pycor] of self + 1) [pzcor] of self [
    set w-direction 3
  ]
]

```

```

    ]
  ]
  if w-direction = 6 [
    ask patch [pxcor] of self [pycor] of self ([pzcor] of self - 1) [
      if surface != true [
        set w-direction 6
      ]
    ]
  ]
]
]
End

```

to Sclose

```

  if Direction-O = "North" or Direction-O = "South" [
    ask patches with [surface = true] [
      if [surface] of patch ([pxcor] of self - 6) [pycor] of self [pzcor] of self = true [
        ask patch ([pxcor] of self - 1) [pycor] of self [pzcor] of self [
          if surface != true [
            set s-close true
          ]
        ]
      ]
      ask patch ([pxcor] of self - 2) [pycor] of self [pzcor] of self [
        if surface != true [
          set s-close true
        ]
      ]
      ask patch ([pxcor] of self - 3) [pycor] of self [pzcor] of self [
        if surface != true [
          set s-close true
        ]
      ]
    ]
  ]
  if [surface] of patch ([pxcor] of self + 6) [pycor] of self [pzcor] of self = true [
    ask patch ([pxcor] of self + 1) [pycor] of self [pzcor] of self [
      if surface != true [
        set s-close true
      ]
    ]
  ]
  ask patch ([pxcor] of self + 2) [pycor] of self [pzcor] of self [
    if surface != true [
      set s-close true
    ]
  ]
]

```

```

        ask patch ([pxcor] of self + 3) [pycor] of self [pzcor] of self [
            if surface != true [
                set s-close true
            ]
        ]
    ]
]
ask patches with [s-close = true] [
    if Direction-O = "North" [
        set s-temp 0
        while [s-temp != 5] [
            set s-temp s-temp + 1
            ask patch [pxcor] of self ([pycor] of self - s-temp) [pzcor] of self [
                set s-close true
            ]
        ]
    ]
]
ask patches with [s-close = true] [
    if Direction-O = "South" [
        set s-temp 0
        while [s-temp != 5] [
            set s-temp s-temp + 1
            ask patch [pxcor] of self ([pycor] of self + s-temp) [pzcor] of self [
                set s-close true
            ]
        ]
    ]
]
]
if Direction-O = "East" or Direction-O = "West" [
    ask patches with [Surface = true] [
        if [surface] of patch [pxcor] of self ([pycor] of self - 6) [pzcor] of self = true [
            ask patch [pxcor] of self ([pycor] of self - 1) [pzcor] of self [
                if surface != true [
                    set s-close true
                ]
            ]
        ]
        ask patch [pxcor] of self ([pycor] of self - 2) [pzcor] of self [
            if surface != true [
                set s-close true
            ]
        ]
        ask patch [pxcor] of self ([pycor] of self - 3) [pzcor] of self [

```

```

        if surface != true [
            set s-close true
        ]
    ]
]
if [surface] of patch [pxcor] of self ([pycor] of self + 6) [pzcor] of self = true [
    ask patch [pxcor] of self ([pycor] of self + 1) [pzcor] of self [
        if surface != true [
            set s-close true
        ]
    ]
    ask patch [pxcor] of self ([pycor] of self + 2) [pzcor] of self [
        if surface != true [
            set s-close true
        ]
    ]
    ask patch [pxcor] of self ([pycor] of self + 3) [pzcor] of self [
        if surface != true [
            set s-close true
        ]
    ]
]
]
]
ask patches with [s-close = true] [
    if Direction-O = "West" [
        set s-temp 0
        while [s-temp != 5] [
            set s-temp s-temp + 1
            ask patch ([pxcor] of self + s-temp) [pycor] of self [pzcor] of self [
                set s-close true
            ]
        ]
    ]
]
ask patches with [s-close = true] [
    if Direction-O = "East" [
        set s-temp 0
        while [s-temp != 5] [
            set s-temp s-temp + 1
            ask patch ([pxcor] of self - s-temp) [pycor] of self [pzcor] of self [
                set s-close true
            ]
        ]
    ]
]
]

```

```
    ]  
  ]  
end
```

to Reset

```
  ask patches with [pzcor = 0] [  
    set strue false  
  ]  
  ask patches with [pycor > -8 and pycor < -4 and pzcor < 8] [  
    set strue false  
  ]  
  ask patches with [pycor > -2 and pycor < 2 and pzcor < 8] [  
    set strue false  
  ]  
end
```

to Diffusion

```
  run [  
    Diffusion-E  
    Diffusion-WT-2  
    Diffusion-WT-5  
    Diffusion-WT-3  
    Diffusion-WT-4  
    Clear  
  ]  
  tick  
end
```

To Diffusion-E

```
  ask Patches with [s-close != true and w-direction != 6] [  
    if smog > 0.0001 [  
      set osmog smog  
      ask neighbors6 [  
        if surface != true and smog <= 0.0001 [  
          set smog (osmog / (7 - restriction))  
          if smog > .0001 [  
            set pcolor (37 - (smog / 20))  
          ]  
        ]  
      ]  
      if smog > 0.0001 [  
        set nsmog smog  
        set smog (nsmog + (osmog / (7 - restriction)))  
        if smog > 100 [  
          set smog 100  
        ]  
      ]  
    ]  
  ]
```

```

        ]
        if smog > .0001 [
            set pcolor (37 - (smog / 20))
        ]
    ]
    ]
    set smog (osmog / (7 - restriction))
]
if smog > .0001 [
    set pcolor (37 - (smog / 20))
]
]
end

```

to Diffusion-WT-2

```

set scout 0
set osmog count patches with [smog > .0001]
ask patches with [s-close = true and w-direction = 2] [
    if smog > .0001 [
        ask patch ([pxcor] of self + 1) [pycor] of self [pzcor] of self [
            set tempismog [smog] of patch ([pxcor] of self - 1) [pycor] of self [pzcor] of self
            set scout scout + 1
        ]
        set smog 0
    ]
]
if osmog = scout [
    ask patches with [tempismog > 0 and s-close = true and w-direction = 2] [
        set smog tempismog
        set tempismog 0
        if smog > .0001 [
            set pcolor (37 - (smog / 20))
        ]
    ]
]
ask patches with [surface != true and pxcor != max-pxcor and smog > .0001 and s-close =
true and w-direction = 2] [
    set osmog smog
    ask neighbors6 [
        set nsmog smog
    ]
]

```

```

    if surface != true and smog < 0.0001 [
        set smog (osmog / (6 - restriction))
        if smog > .0001 [
            set pcolor (37 - (smog / 20))
        ]
    ]
    if surface != true and smog > 0.0001 [
        set smog (nsmog + (osmog / (6 - restriction)))
        if smog > 100 [
            set smog 100
        ]
        if smog > .0001 [
            set pcolor (37 - (smog / 20))
        ]
    ]
]
ask patch ([pxcor] of self - 1) [pycor] of self [pzcor] of self [
    set smog nsmog
]
set smog (osmog / (6 - restriction))
]
end

```

to Diffusion-WT-5

```

    set scout 0
    set osmog count patches with [smog > .0001]
    ask patches with [s-close = true and w-direction = 5] [
        if smog > .0001 [
            ask patch ([pxcor] of self - 1) [pycor] of self [pzcor] of self [
                set tempismog [smog] of patch ([pxcor] of self + 1) [pycor] of self [pzcor] of self
                set scout scout + 1
            ]
            set smog 0
        ]
    ]
    if osmog = scout [
        ask patches with [tempismog > 0 and s-close = true and w-direction = 5] [
            set smog tempismog
            set tempismog 0
            if smog > .0001 [

```

```

        set pcolor (37 - (smog / 20))
    ]
]
ask patches with [surface != true and pxcor != min-pxcor and smog > .0001 and s-close =
true and w-direction = 5] [
    set osmog smog
    ask neighbors6 [
        set nsmog smog
        if surface != true and smog < 0.0001 [
            set smog (osmog / (6 - restriction))
            if smog > .0001 [
                set pcolor (37 - (smog / 20))
            ]
        ]
        if surface != true and smog > 0.0001 [
            set smog (nsmog + (osmog / (6 - restriction)))
            if smog > 100 [
                set smog 100
            ]
            if smog > .0001 [
                set pcolor (37 - (smog / 20))
            ]
        ]
    ]
]
ask patch ([pxcor] of self + 1) [pycor] of self [pzcor] of self [
    set smog nsmog
]
set smog (osmog / (6 - restriction))
]
end

```

to Diffusion-WT-3

```

    set scout 0
    set osmog count patches with [smog > .0001]
    ask patches with [s-close = true and w-direction = 3] [
        if smog > .0001 [
            ask patch [pxcor] of self ([pycor] of self + 1) [pzcor] of self [
                set tempismog [smog] of patch [pxcor] of self ([pycor] of self - 1) [pzcor] of self
                set scout scout + 1
            ]
            set smog 0
        ]
    ]
]

```

```

if osmog = scout [
  ask patches with [tempismog > 0 and s-close = true and w-direction = 3] [
    set smog tempismog
    set tempismog 0
    if smog > .0001 [
      set pcolor (37 - (smog / 20))
    ]
  ]
]
ask patches with [surface != true and pycor != max-pxcor and smog > .0001 and s-close =
true and w-direction = 3] [
  set osmog smog
  ask neighbors6 [
    set nsmog smog
    if surface != true and smog < 0.0001 [
      set smog (osmog / (6 - restriction))
      if smog > .0001 [
        set pcolor (37 - (smog / 20))
      ]
    ]
    if surface != true and smog > 0.0001 [
      set smog (nsmog + (osmog / (6 - restriction)))
      if smog > 100 [
        set smog 100
      ]
      if smog > .0001 [
        set pcolor (37 - (smog / 20))
      ]
    ]
  ]
]
ask patch [pxcor] of self ([pycor] of self - 1) [pzcor] of self [
  set smog nsmog
]
set smog (osmog / (6 - restriction))
]
end

```

to Diffusion-WT-4

```

set scout 0
set osmog count patches with [smog > .0001]
ask patches with [s-close = true and w-direction = 4] [
  if smog > .0001 [
    ask patch [pxcor] of self ([pycor] of self - 1) [pzcor] of self [
      set tempismog [smog] of patch [pxcor] of self ([pycor] of self + 1) [pzcor] of self
    ]
  ]
]

```

```

        set scout scout + 1
    ]
    set smog 0
]
]
if osmog = scout [
    ask patches with [tempismog > 0 and s-close = true and w-direction = 4] [
        set smog tempismog
        set tempismog 0
        if smog > .0001 [
            set pcolor (37 - (smog / 20))
        ]
    ]
]
ask patches with [surface != true and pycor != min-pxcor and smog > .0001 and s-close =
true and w-direction = 4] [
    set osmog smog
    ask neighbors6 [
        set nsmog smog
        if surface != true and smog < 0.0001 [
            set smog (osmog / (6 - restriction))
            if smog > .0001 [
                set pcolor (37 - (smog / 20))
            ]
        ]
        if surface != true and smog > 0.0001 [
            set smog (nsmog + (osmog / (6 - restriction)))
            if smog > 100 [
                set smog 100
            ]
            if smog > .0001 [
                set pcolor (37 - (smog / 20))
            ]
        ]
    ]
]
ask patch [pxcor] of self ([pycor] of self + 1) [pzcor] of self [
    set smog nsmog
]
set smog (osmog / (6 - restriction))
]
end

```

```

to Diffusion-WT-6
    set scout 0

```

```

set osmog count patches with [smog > .0001]
ask patches with [w-direction = 6] [
  if smog > .0001 [
    ask patch [pxcor] of self [pycor] of self ([pzcor] of self - 1) [
      set tempsmog [smog] of patch [pxcor] of self ([pycor] of self + 1) [pzcor] of self
      set scout scout + 1
    ]
    set smog 0
  ]
]
if osmog = scout [
  ask patches with [tempsmog > 0 and s-close = true and w-direction = 6] [
    set smog tempsmog
    set tempsmog 0
    if smog > .0001 [
      set pcolor (37 - (smog / 20))
    ]
  ]
]
ask patches with [surface != true and smog > .0001 and w-direction = 6] [
  set osmog smog
  ask neighbors6 [
    set nsmog smog
    if surface != true and smog < 0.0001 [
      set smog (osmog / (6 - restriction))
      if smog > .0001 [
        set pcolor (37 - (smog / 20))
      ]
    ]
    if surface != true and smog > 0.0001 [
      set smog (nsmog + (osmog / (6 - restriction)))
      if smog > 100 [
        set smog 100
      ]
      if smog > .0001 [
        set pcolor (37 - (smog / 20))
      ]
    ]
  ]
  ask patch [pxcor] of self ([pycor] of self + 1) [pzcor] of self [
    set smog nsmog
  ]
  set smog (osmog / (6 - restriction))
]

```

end

to Clear

```
ask patches [
  if surface != true and smog < .0001 [
    set pcolor [0 0 0 0]
    set smog 0
  ]
  if pxcor = max-pxcor or pxcor = min-pxcor or pycor = max-pycor or pycor = min-pycor or
  pzcor = max-pzcor [
    set smog 0
  ]
  if count neighbors4 with [pcolor = grey and surface = true] = 4 and pzcor = 0 [
    ask patch [pxcor] of self [pycor] of self ([pzcor] of self + 1) [
      ifelse ticks < 21 or ticks > 55 [
        set smog 100
      ]
      [
        set smog 25
      ]
    ]
  ]
]
```

end

To Removal

```
ask patches [
  if TiO2 = true and strue = true [
    ask neighbors6 [
      set nsmog smog
      if smog > 0 [
        set smog 0
      ]
    ]
  ]
  if TiO2 = true and strue != true [
    ask neighbors6 [
      set nsmog smog
      if smog > 0 [
        set smog (.5 * nsmog)
      ]
    ]
  ]
]
```

end