

```
In [1]: 1 import arlpy.uwapm as pm
        2 import arlpy.plot as plt
        3 import numpy as np
```

```
In [2]: 1 pm.models()
```

```
Out[2]: ['bellhop']
```

```
In [3]: 1 !which bellhop.exe
```

```
/home/jay/Documents/newat/2020/bellhop.exe
```

```
In [4]: 1 env = pm.create_env2d()
        2 pm.print_env(env)
```

```
          name : arlpy
bottom_absorption : 0.1
  bottom_density : 1600
  bottom_roughness : 0
bottom_soundspeed : 1600
          depth : 25
  depth_interp : linear
    frequency : 25000
    max_angle : 80
    min_angle : -80
      nbeams : 0
    rx_depth : 10
    rx_range : 1000
    soundspeed : 1500
soundspeed_interp : spline
      surface : None
  surface_interp : linear
    tx_depth : 5
tx_directionality : None
          type : 2D
```

```
In [5]: 1 pm.plot_env(env, width=900)
```

```
In [6]: 1 rays = pm.compute_eigenrays(env)
        2 pm.plot_rays(rays, env=env, width=900)
```

```
In [7]: 1 rays = pm.compute_eigenrays(env, debug=True)
        2 pm.plot_rays(rays, env=env, width=900)
```

```
[DEBUG] Model: bellhop
[DEBUG] Bellhop working files: /tmp/tmpgk5iw2fm.*
```

```
In [8]: 1 arrivals = pm.compute_arrivals(env, debug=True)
        2 pm.plot_arrivals(arrivals, width=900)
```

```
[DEBUG] Model: bellhop
type of freq: <class 'tuple'>
[DEBUG] Bellhop working files: /tmp/tmp8tow8ltd.*
```

```
In [9]: 1 arrivals[arrivals.arrival_number < 10][['time_of_arrival', 'arrival_amplitude', 'angle_of_arri']
```

```
Out[9]:
```

	time_of_arrival	arrival_amplitude	angle_of_arrival	surface_bounces	bottom_bounces
1	0.721796	-5.345778e-06-2.367754e-06j	22.538252	9	8
2	0.716791	7.827161e-06+1.457859e-05j	-21.553991	8	8
3	0.709687	-4.552358e-07-2.436653e-07j	20.084017	8	7
4	0.709687	-2.161610e-04-9.366950e-05j	20.052010	8	7
5	0.705226	-1.553080e-04+2.801340e-04j	-19.034414	7	7
6	0.698960	2.048742e-04-3.106344e-04j	17.484421	7	6
7	0.695070	-3.671107e-04+1.185680e-04j	-16.436060	6	6
8	0.689678	6.193695e-05+4.064829e-04j	14.842224	6	5
9	0.686383	4.156857e-04-5.102108e-05j	-13.766296	5	5
10	0.681901	3.545845e-04+2.568755e-04j	12.133879	5	4

In []:

1	
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