Yale 耶鲁大学-南京信息工程大学大气环境中心
Yale-NUIST Center on Atmospheric Environment

Optical property of a plastic cover for simulating haze effects on crop yield

Reporter: Yue Kun

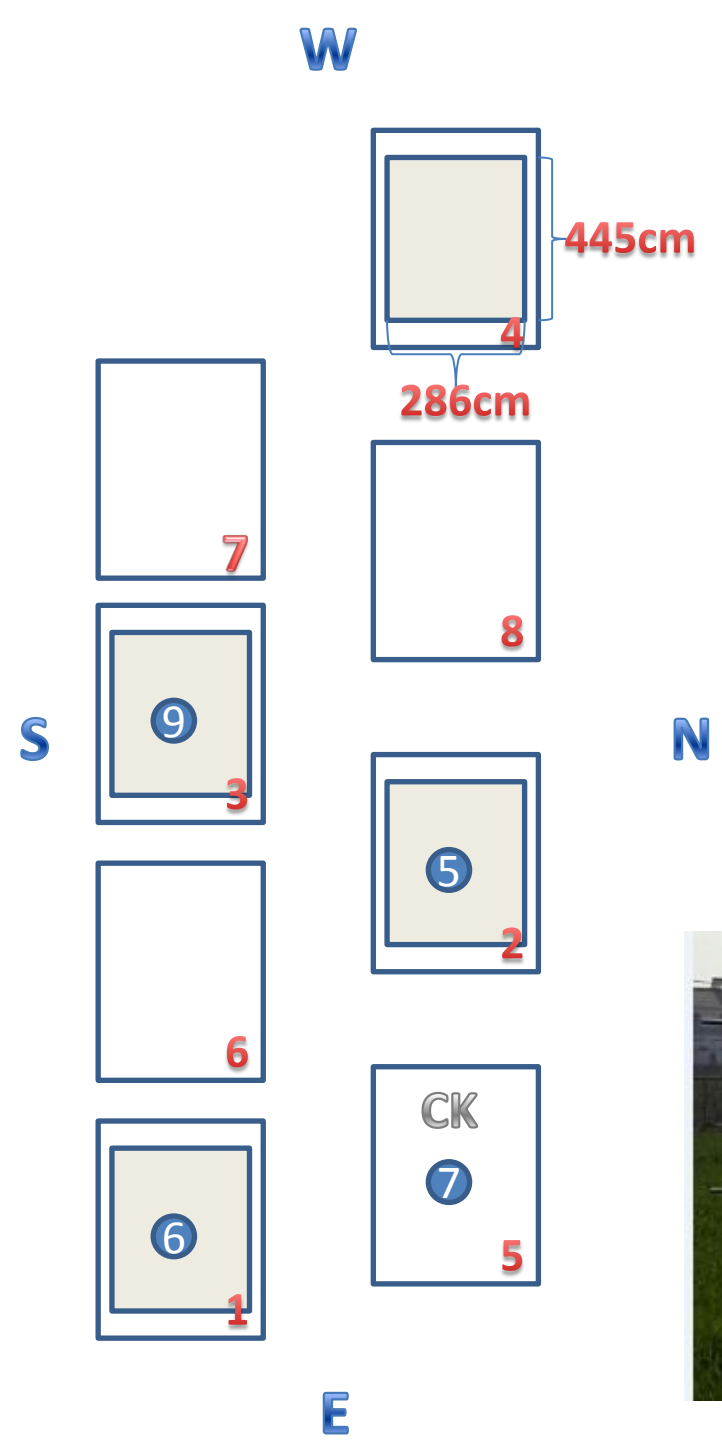
Background and Objectives

- Solar radiation at the Earth's surface (surface solar radiation, SSR) is the ultimate energy source for life on the planet.
- Several studies suggested that the increasing anthropogenic aerosol amount due to air pollution is a major factor for the SSR decreasing and that increased diffuse radiation.
- How the increased diffuse radiation affect the crop growth and production is still a question.
- A plastic film can simulate the haze effect on crop yield.
- We are simulation the heavy pollution, that is global solar radiation decrease by 20%, the ratio of diffuse radiation to global radiation increase by about 30%.
- In order to get a good simulation, we test the optical properties of the plastic film.

Materials and Methods

- **Sun Spectoradiometer** (S-2440C) is applied to observe the solar radiation spectrum.

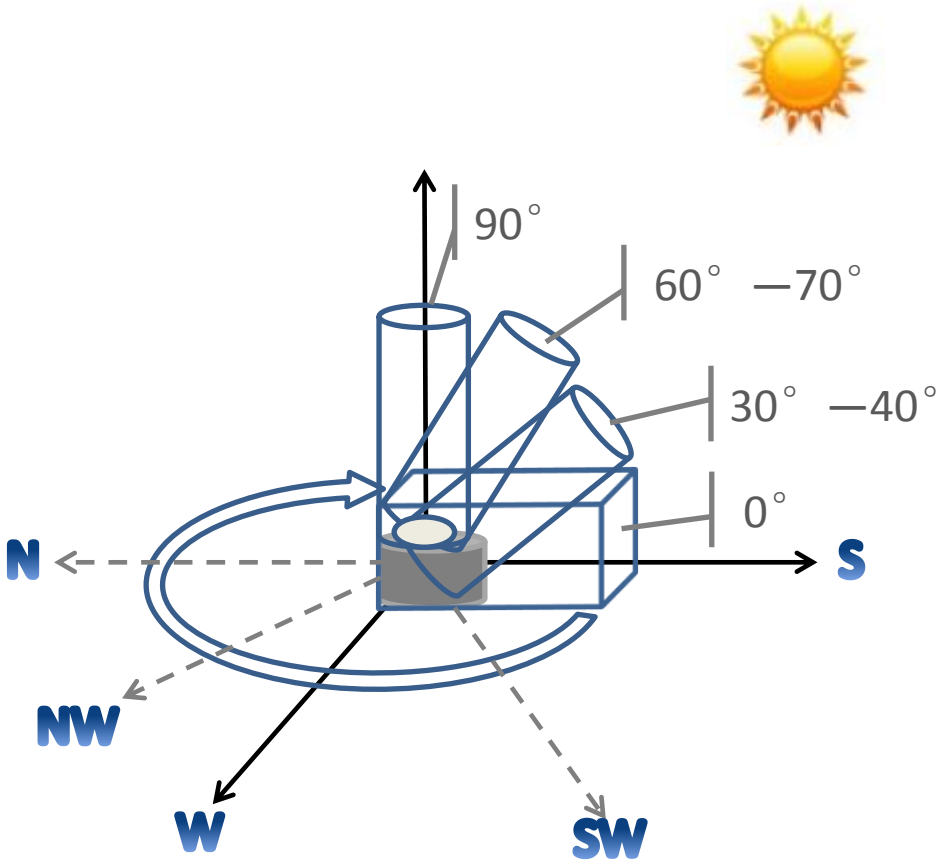
- **Sunshine Pyranometer** (SPN1) is applied to observe the global solar radiation (S_t) *and diffuse* radiation *(*S_f*).*



Materials and Methods

- Yong Feng： 32.208889° N
  118.676667° E
  Time: 2014/3/17 up to now

Materials and Methods



Results and Discussions

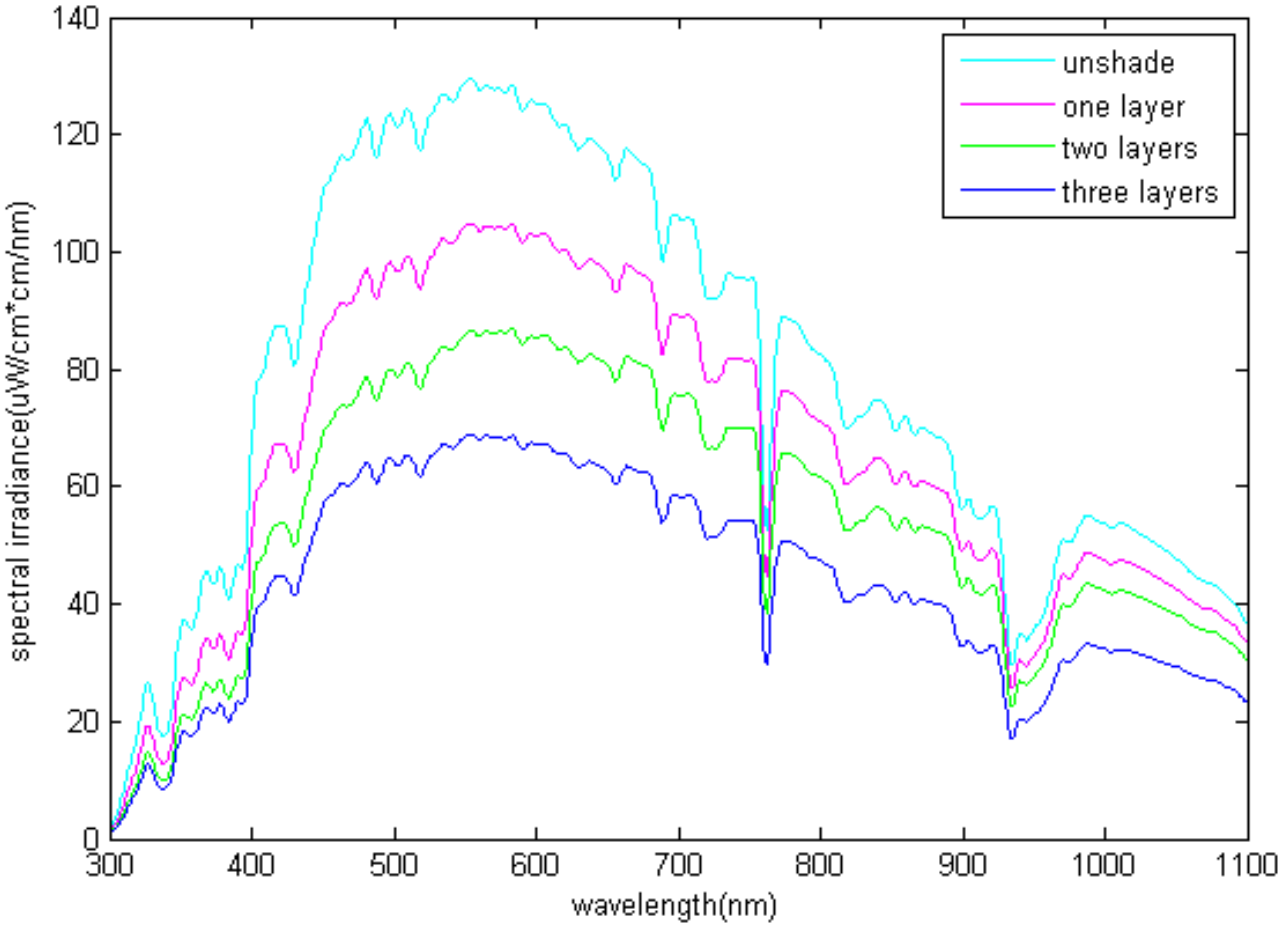


Figure 1 The spectrum irradiance of Sun under No. 12 plastic film

Results and Discussions

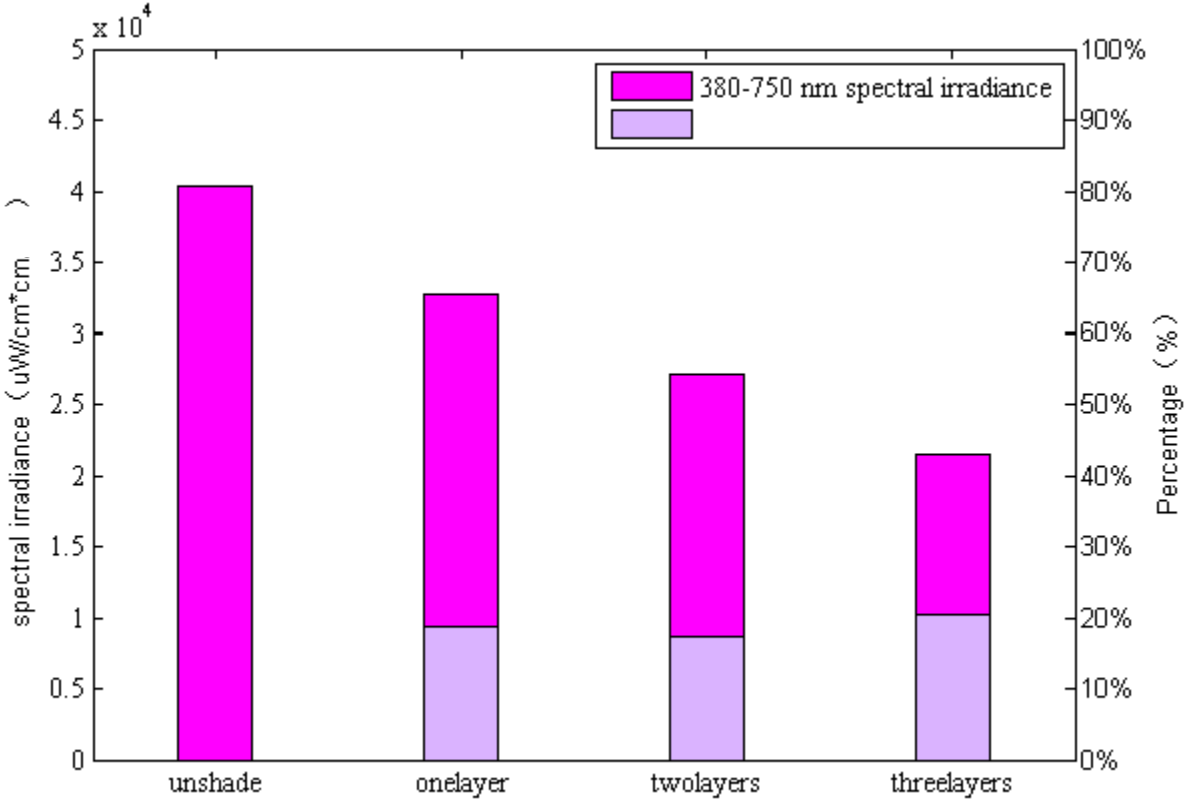


Figure 2 The spectrum irradiance of 380-750 nm

Results and Discussions

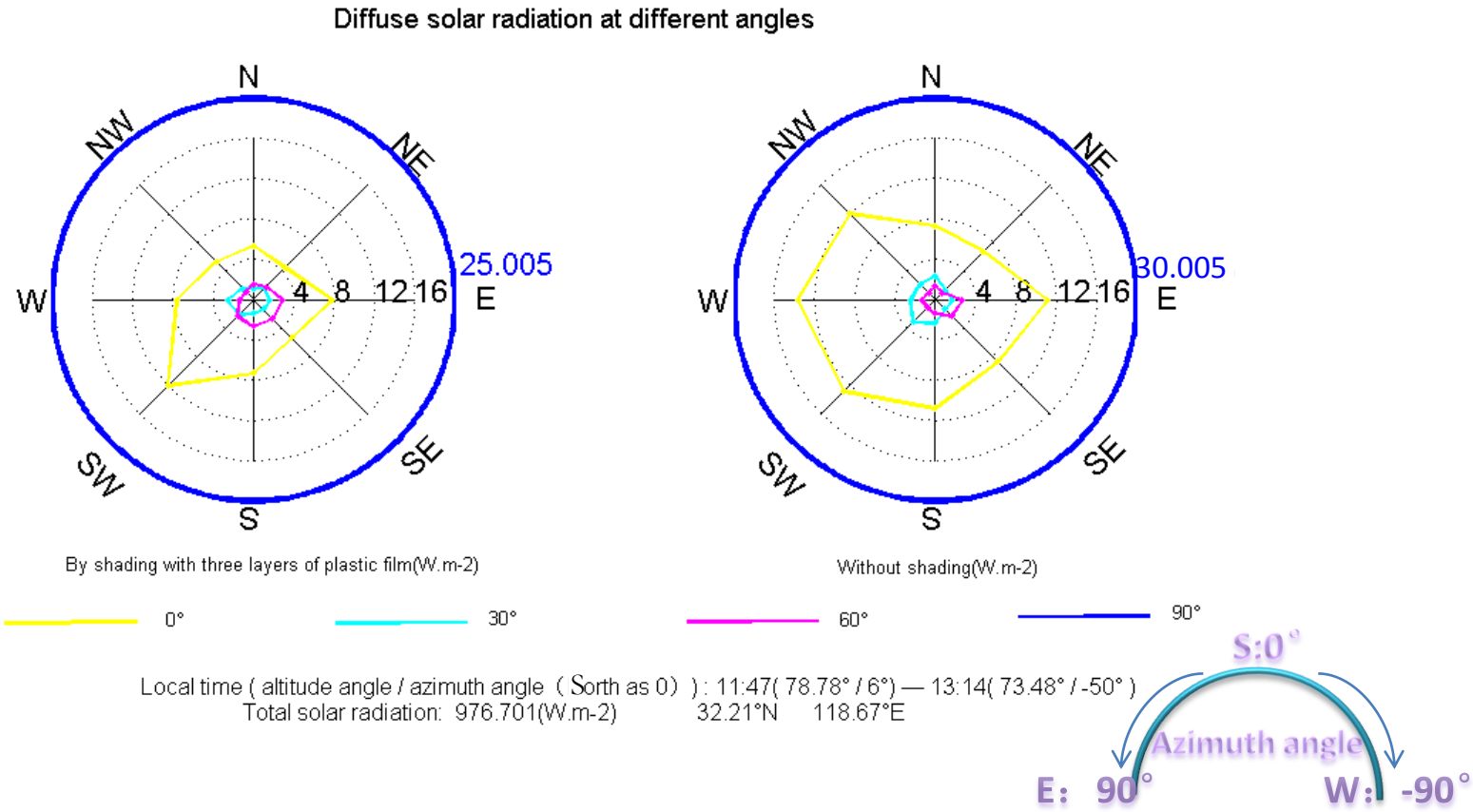


Figure 3 The diffuse solar radiation at different angles and aspects

Results and Discussions

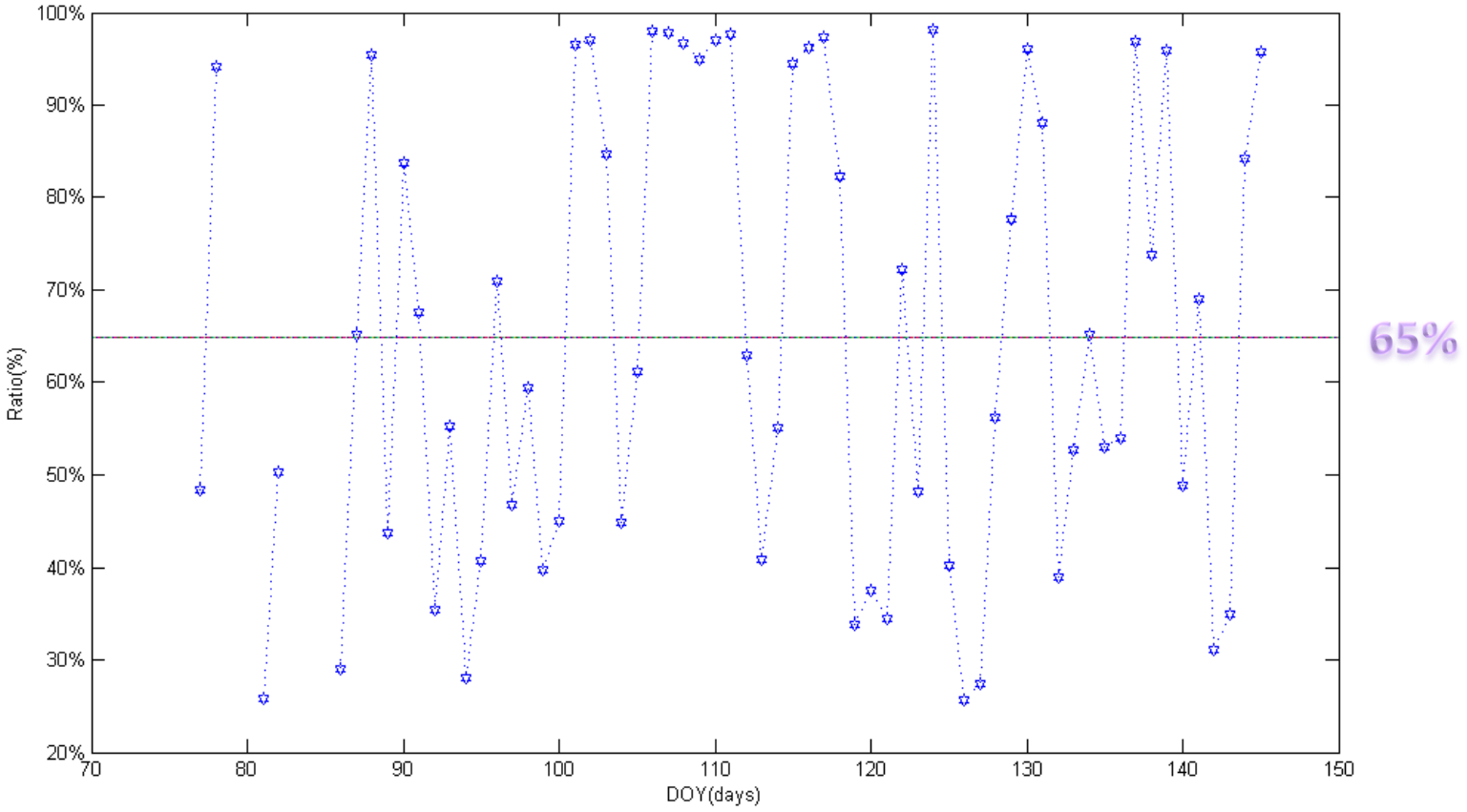


Figure 4 The daily diffuse solar radiation fraction of global solar radiation without shading

Results and Discussions

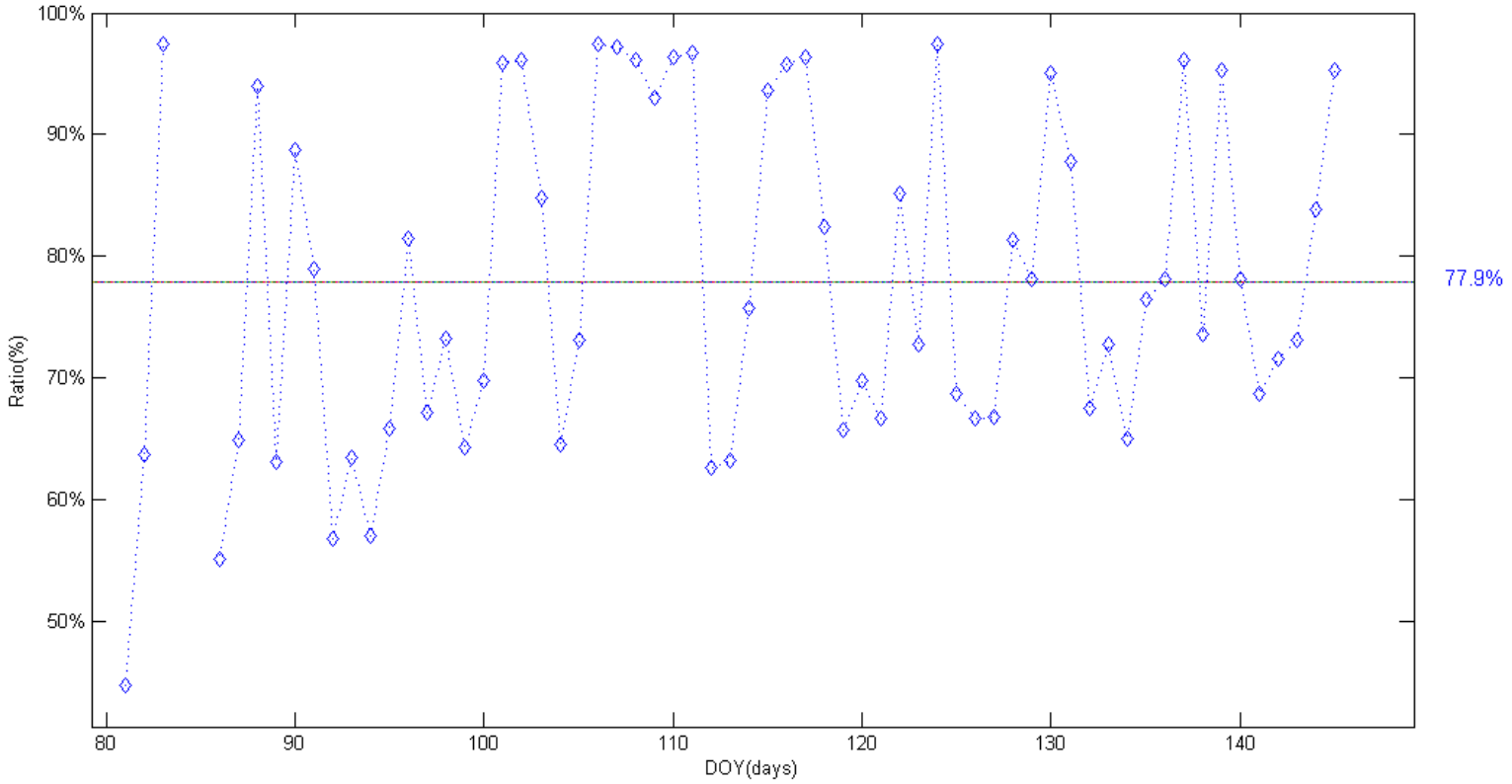


Figure 5 The daily diffuse solar radiation fraction of global solar radiation with shading

Results and Discussions

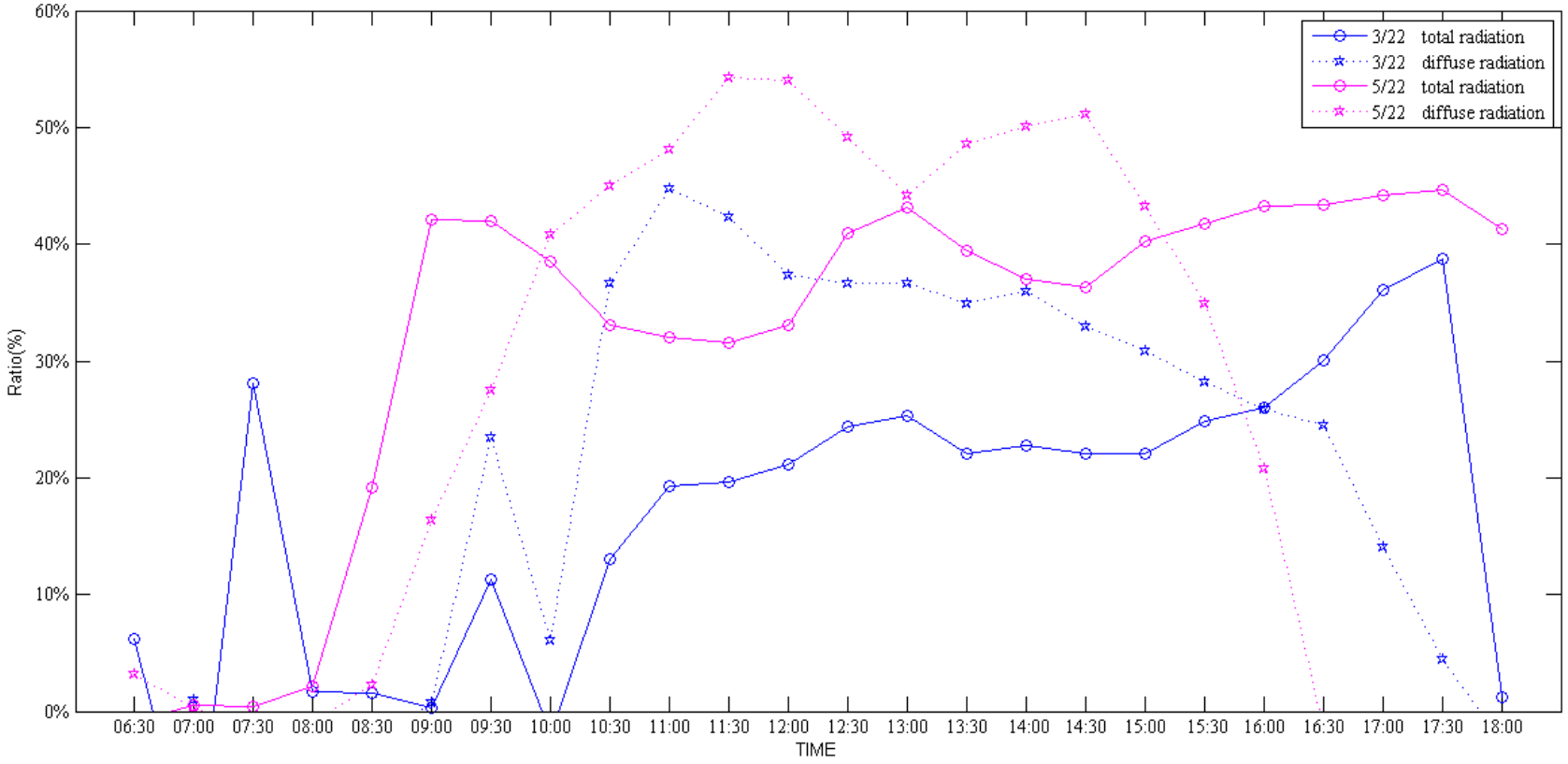


Figure 6 The diffuse solar radiation (global solar radiation) with shading fraction of without shading

Results and Discussions

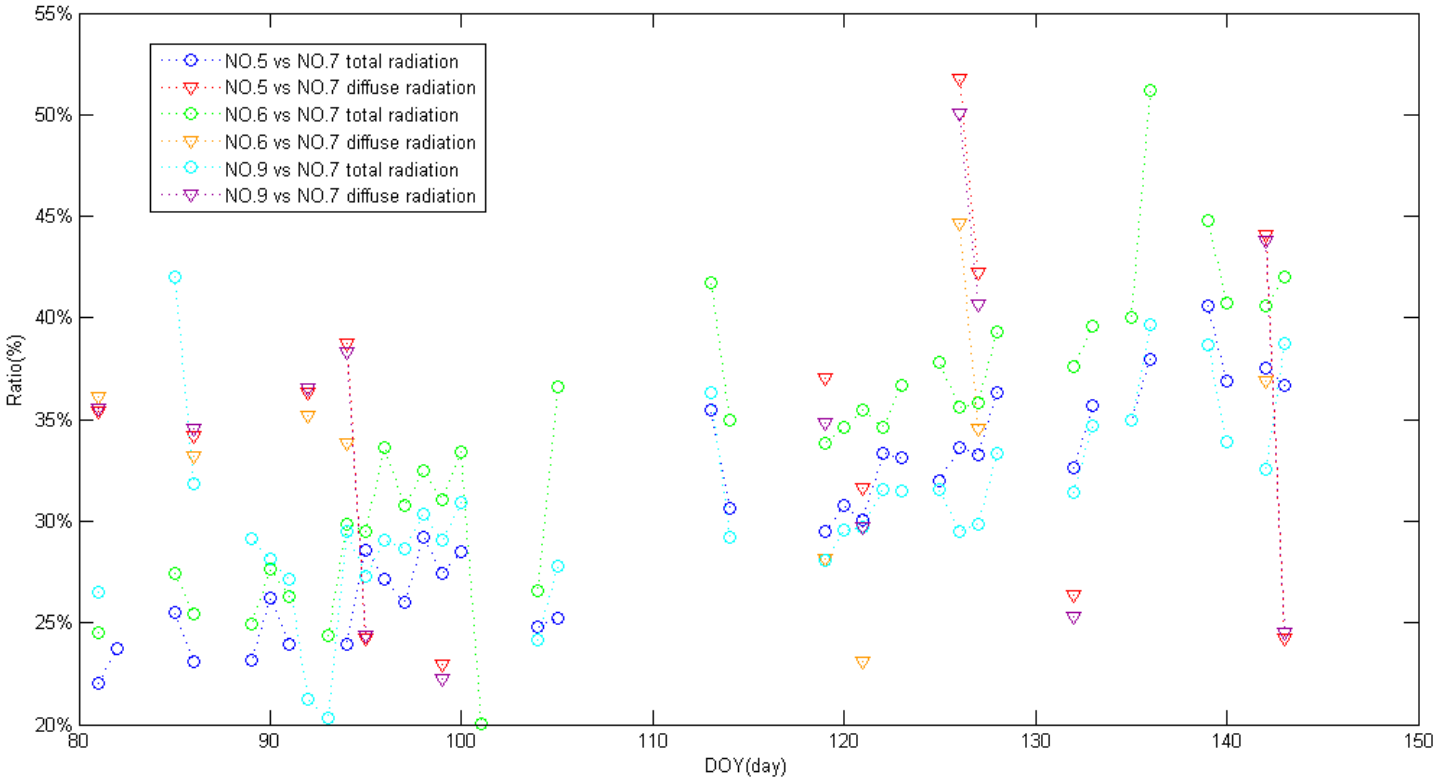


Figure 7 The daily diffuse solar radiation (global solar radiation) with shading fraction of without shading

Conclusion

- From what has been tested the optical property of a plastic film and applied to the growing season above, we may reasonably come to the conclusion that We believe plastic films for shade by changing the ratio of the radiation and this effect of plastic films for simulating haze are feasible.

Thank You !