

# Galactic Cosmic Rays (GCRs) and Cloud Cover(CC) on the Earth

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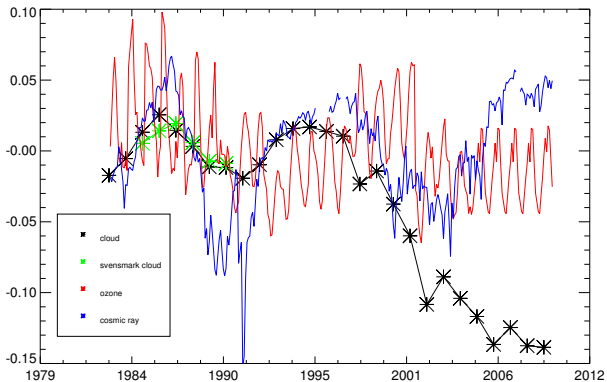
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# Backgrounds

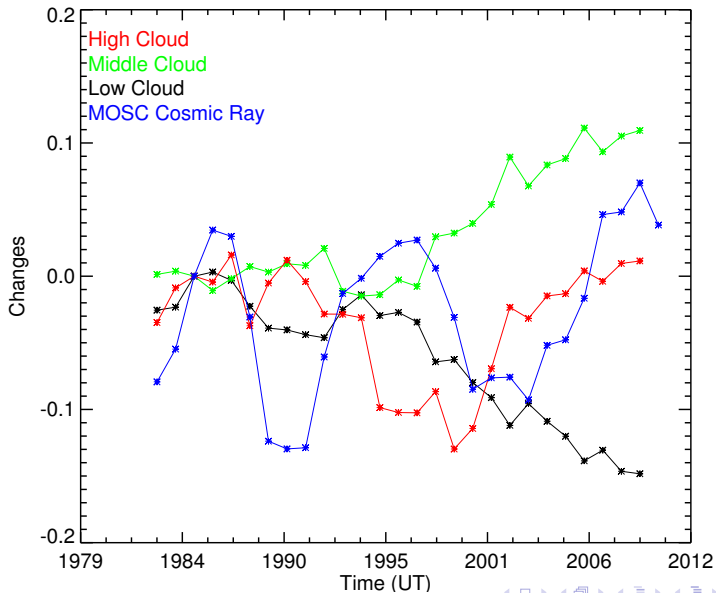
- ▶ GCRs only affect the low clouds. (Svensmark and FriisChristensen 1997; Svensmark 2007; Marsh and Svensmark 2003,2004)
- ▶ No obvious correlation between GCRs and the clouds. (Sloan and Wolfendale 2008; Kulmala et al. 2010);
- ▶ GCRs and clouds only related with each other in some specific regions. (Erlykin et al. 2010; Kristjansson et al. 2008);
- ▶ It is the UV that make the clouds amount to vary with solar cycles. (Erlykin et al. 2010; Udelhofen and Cess 2001)

## Part I: Some Results Using ISCCP D2 Data

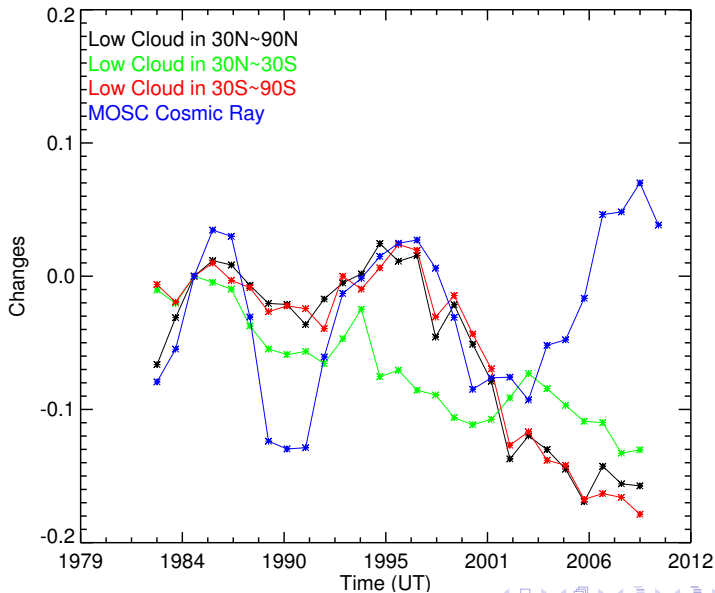
# Comparison with Svensmark and Friis-Christensen (1997)



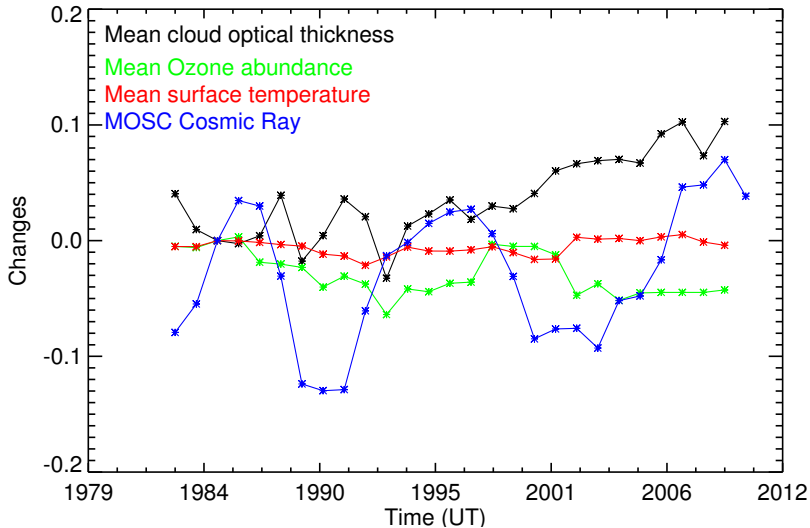
# Clouds with Different Altitudes and GCRs



# Low Clouds in Different Regions and GCRs



## Some Other Global Parameters and GCRs



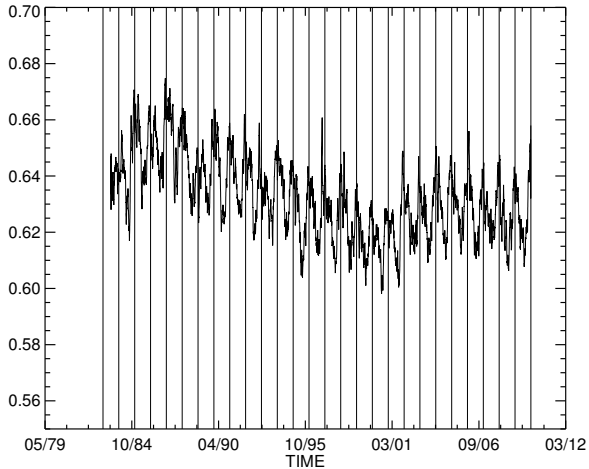
## Some Conclusions of Our Study

- ▶ In theory, GCRs influence the amount of high cloud. Our study shows that there is a positive correlation between GCRs and low cloud amount during the period of 1983 to 2001. After 2001, the correlation vanished. Low clouds decreased annually. In the contrary, the other two kinds of clouds and the GCRs increased year by year.
- ▶ During 1983-2001, the correlations between GCRs and low clouds in the polar regions are more obvious.

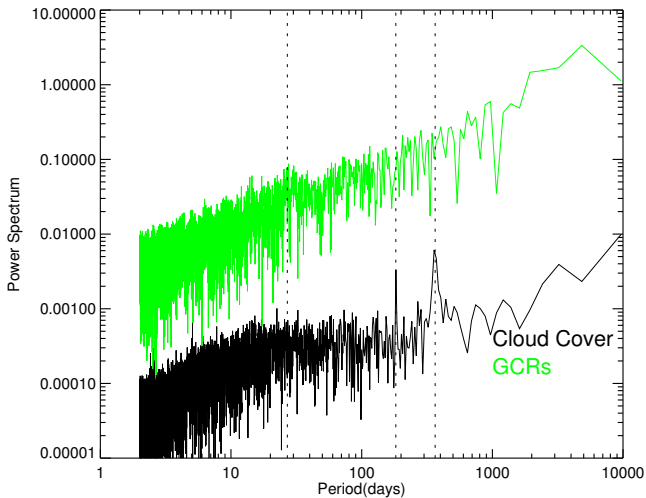


## Part II: Some Results Using ISCCP D1 Data

# Global Cloud Cover from ISCCP Observation

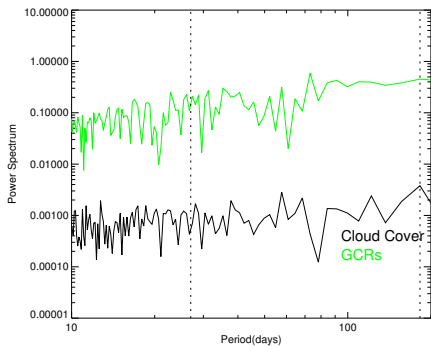


# FFT of the Global Cloud Amount from 1983 to 2009

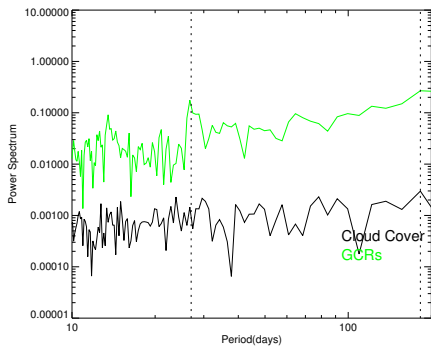


# FFT of the Global Cloud Amount in Different Periods

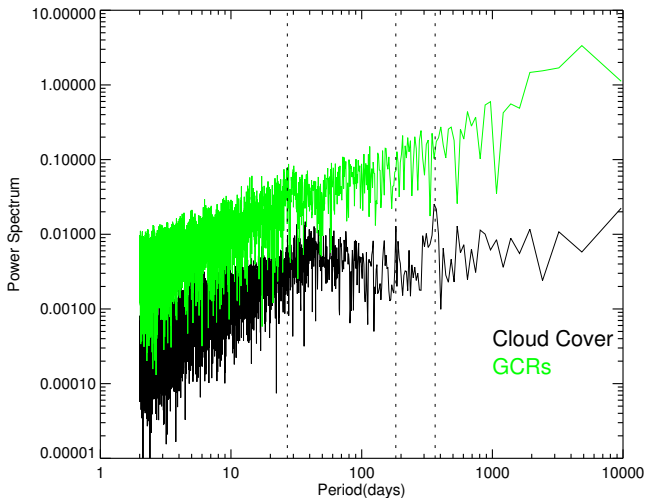
## Maximum Years: 1989-1991



## Minimum Years: 2007-2009

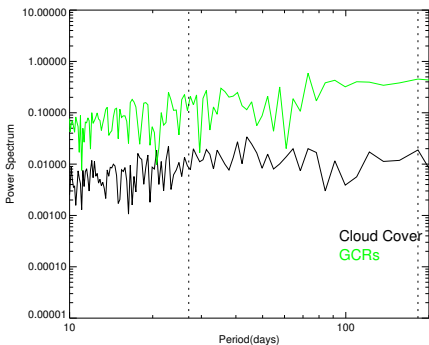


# FFT of the Cloud Amount in the Western Pacific Warm Pool (WPWP) from 1983 to 2009

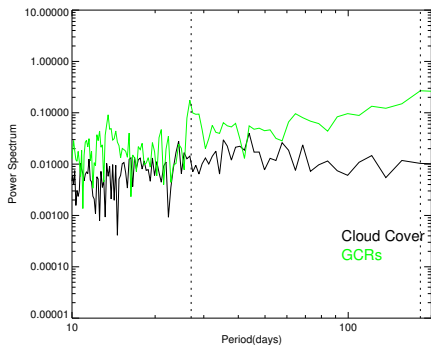


# FFT of Cloud Amount in WPWP in Different Periods

## Maximum Years: 1989-1991



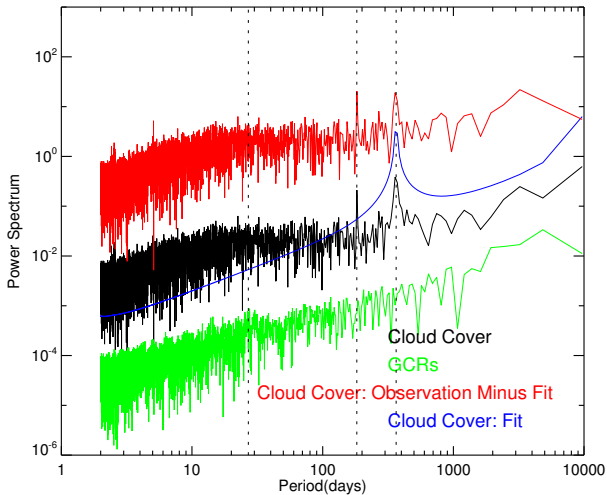
## Minimum Years: 2007-2009



## Some Conclusions of Our Study

- ▶ No 27-day variation in the cloud amount is found using the ISCCP D1 data.

# One Possible Method to Remove the Internal Influence





Thank you !