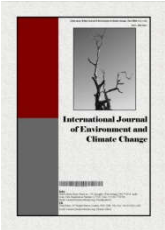

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Astrometeorology: Relationship between Two Planet's Aspect and Cyclone Events over Bay of Bengal (BOB)

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Authors' contributions

This work was carried out in collaboration among all authors. Author TS preparation of manuscript and analysis the data. Author GD designed the problem, methodology and guided to complete the research work in organized way. Author SK Advisory Committee of thesis research and worked in correlation part of the thesis research. Author SPR Worked on verification part of the thesis research and helped in the presentation of this manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aim: Identifying the astrometeorological relationship between two planet's aspect and cyclone events over Bay of Bengal (BOB).
Study Design: Correlating the two planet aspects calculated from the ephemeris and different stages of Cyclone event.
Place and Duration of Study: The study was conducted as a part of post graduate thesis research at Agro Climate Research Centre, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India.
Methodology: Collection of Cyclone track and their stage for each cyclone event observed from 1990 to 2016 over Bay of Bengal (BOB). Calculating planetary position for the cyclone track (eye

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point) and developing two planet's aspects from the ephemeris. Correlating the two planet aspects and Cyclone event to identify frequency.

Results: Among the 36 two planets aspects studied, Uranus – Neptune and Sun – Mercury and Sun – Venus had higher influence on all the cyclone categories, whereas the Saturn – Uranus, Saturn - Neptune and Venus – Mars had high influence on high intensity cyclones from Very Severe Cyclone to Super Cyclone system. The highest number of category 'D' cyclones were observed with the conjunction of Uranus – Neptune (69.8%), category 'DD' in the Uranus – Neptune (67.6%), category 'CS' in the Uranus - Neptune (64.8%), category 'SCS' in the Uranus - Neptune (66.8%), category 'VSCS' in the Uranus – Neptune (68.3%), category 'VSCS' in the Uranus – Neptune (64.7%) and the category 'SUCS' in the Saturn conjunction with Uranus and Neptune (76.9%).

Conclusion: The study inferenced that, irrespective of 36 two-planet combinations, the 0-30 degrees two-planet aspects had more influence on cyclone intensity than other aspects of any two planets, in particular 0 – 10 degree aspects. Squares and oppositions angles between Mars, Saturn, Uranus and Neptune are considered to be storm breeders and these angle between Mars and Saturn or Mars and Uranus can influence the formation of very energetic storm systems.

Keywords: Astrometeorology; cyclone; two planet's aspect; BOB.

1. INTRODUCTION

Agricultural sector is the primary source of the Indian economy, almost half of the country 's workforce depends on it and rainfall playing a major role in its success. The occurrences of monsoonal rainfall are due to low pressure system over the sea surfaces of both Bay of Bengal (BOB) and Arabian Sea (AS). Though the frequency of cyclone events at BOB is four times more than AS with maximum sustained surface wind speed (MSW) of 17 knots or more [1]. BOB cyclones have a tendency to move west or northwestwards, through Indian states viz., Tamil Nadu, Andhra Pradesh, Odisha and West Bengal, producing more rainfall during North East Monsoon [2]. Nivedita et al. [3] and Clark et al. [4] have stated in their studies that Indian monsoon rainfall statistically have high positive correlation with the sea-surface temperatures (SSTs) over most parts of the north Indian Ocean at lead times of 6–12 months.

Astrometeorology is a great science followed from way back in the 3rd century BC, which mostly concentrate on predictions of rainfall. Conversely, this can be seen odd to find an explanation for weather fluctuations occurring in earth systems due to the celestial geometry of stars and planets, but the collective wisdom of these is obvious and inevitable [5]. Considering the abnormality in weather prediction over Indian sub-continent, Tamil Nadu Agricultural University (TNAU) has had series of astrometeorological studies [6,7,8 and 9] to identify an alternate method of weather forecast. The hybrid weather forecast developed by combining astrometeorology with numerical weather model (NWM) had higher accuracy of rainfall forecast around 74 to 87 per cent and critical success index (CSI) of 52 to 71 per cent [8]. In another study, Rathika et al., [9] concluded that the individual planet azimuth of 61 -120 and 240-300 had good influence on wind speed. Among 36 two planet combinations, Sun-Mercury, Sun-Venus, Mercury-Venus, Mercury-Jupiter, Mars-Saturn had most wind speed events in descending order. If, one nearer planet (Venus, Mercury) and one far away planet (Saturn, Neptune and Uranus) aspect at 151-210 degrees had produced heavy winds speed [10]. Astrometeorological investigation of individual planet's azimuth on Cyclone events by Sankar et al. [11] concluded that the azimuth range of 61 - 120 and 241 - 300 degrees had higher influence on different scales of Cyclone events and most cyclone event influencing planets are Saturn, Uranus, Moon, Mercury, and Venus.

In continuation of the above studies, Astrometeorological relationship between two planet's aspect on cyclone events in Bay of Bengal (BOB) were studied at Tamil Nadu Agricultural University during 2018-19 and the results are presented in this paper.

2. MATERIALS AND METHODS

2.1 Study Area

Destructive cyclones are more common in BOB that brings more rainfall to Tamil Nadu and hence the astrometeorological studies were conducted for the cyclones originating at BOB

region by using historical cyclone data. BOB is the Eastern border of Indian subcontinent, about 1600 km wide and 1900 km long with a maximum depth of 4694 meter, and extent from 8 to 23°N and 78 to 95°E.

2.2 Cyclone Data

Cyclone data collected from the India Meteorological Department (IMD) [12] for the period from 1990 to 2016 were grouped into eight categories based on their intensity of cyclone viz., Low pressure (L), Depression (D), Deep Depression (DD), Cyclonic Storm (CS), Severe Cyclonic Storm (SCS), Very Severe Cyclonic Storm (VSCS), Extremely Severe Cyclonic Storm (ESCS) and Super Cyclonic Storm (SUCS) for the identification of category wise astrometeorological forecast relationship. The category wise number of events used in this study are depicted in Table 1.

2.3 Aspect of Planets and Cyclone Frequency

Azimuth, the planet's positions at the point of each cyclone eye were calculated using Alcyone Ephemeris 4.3v calculator for the Sun, Moon, Mercury, Venus, Mars, Jupiter, Saturn, Neptune and Uranus. From the azimuth, two planet aspects (the angle between two planets) were calculated by keeping observer location as origin. Aspect frequencies of 36 two planet's combinations: Sun - Mercury, Sun - Venus, Sun - Moon, Sun - Mars, Sun - Jupiter, Sun - Saturn, Sun - Uranus, Sun - Neptune, Conjunction Angle, Mercury - Venus, Mercury - Moon, Mercury - Mars, Mercury - Jupiter, Mercury - Saturn, Mercury - Uranus, Mercury - Neptune, Conjunction Angle, Venus - Moon, Venus - Mars, Venus - Jupiter, Venus - Saturn, Venus - Uranus, Venus - Neptune, Moon - Mars, Moon - Jupiter, Conjunction Angle, Moon - Saturn, Moon - Uranus, Moon - Neptune, Mars - Jupiter, Mars - Saturn, Mars - Uranus, Mars - Neptune, Conjunction Angle, Jupiter - Saturn, Jupiter - Uranus, Jupiter - Neptune, Saturn - Uranus, Saturn - Neptune, Uranus - Neptune were further 36 grouped @ 10 degrees interval viz., 0 to 10°, 11 to 20°, 21 to 30°, to . 351° to 360°. The entire aspect frequency calculations were performed in "TNAU Astromet soft". The formulae used for calculating the aspect frequency was given below and expressed in percentage.

$$\text{Aspect frequency (\%)} = \frac{\text{Number of times the planet aspects with same angle during particular cyclone category}}{\text{Total number of cyclone events in the particular cyclone category}}$$

Table 1. Category wise number of cyclonic events used in the astromet study

Sl. No.	Weather systems	Wind speed (km/hour)	No. of events (1990 – 2016)
1.	Area of Low pressure	< 31	2
2.	System of Depression (D)	31 - 49	1317
3.	Deep Depression (DD)	50 - 61	809
4.	Cyclonic storm (CS)	62 - 88	696
5.	Severe cyclonic storm (SCS)	89 - 117	201
6.	Very Severe cyclonic storm (VSCS)	118 - 166	204
7.	Extremely severe cyclonic storm (ESCS)	167 - 221	116
8.	Super cyclonic storm (SUCS)	> 222	13
9.	Total		3358

3. RESULTS

3.1 Cyclone Category - Depression (D)

Two planet's aspect frequency distribution was ranged from 0 to 69.8 per cent, with a standard error of 1.2 to 2.0 for the cyclone category 'D' during 1990 to 2016 (Table 2). The highest number of category 'D' cyclones were observed with the conjunction of Uranus – Neptune (69.8%), followed by Mercury - Moon (60.6%), Venus - Moon (60.4%), Sun - Moon (59.3%), Saturn - Uranus (57.9%), Venus - Saturn (57.4%), Venus – Uranus, Saturn - Neptune at 56.2%, Mercury - Uranus (55.4%), Mercury - Saturn (55.1%), Sun – Uranus (54.4%), Venus – Jupiter (54.3%), Mars – Uranus (54.2%), Mercury – Mars (53.5%), Sun – Saturn (53.4%), Mercury – Jupiter (53.1%), Venus – Mars (52.9%), Venus – Neptune (52.8%), Mercury – Neptune (52.4%), Mars – Neptune (51.9%), Sun – Neptune (51.3%), Mars – Saturn, Sun – Jupiter, Jupiter - Saturn (51.1%), Mercury – Venus (50.6%) and Sun –

Mars (50.3%) aspect at 0 - 10 degrees. Invariably in all two planet combinations, 60 to 80 per cent of 'D' category events were concentrated in 0 – 30 degrees and negatively correlated with increase in aspect angle above 30 degrees.

Table 2. Aspect frequency (%) of cyclone category depression 'D'

Aspect Angle	Two planet aspect (Degree) with cyclone eye as origin						
	1–10	11–20	21–30	31–40	41–50	51–60	SE
Sun - Mercury	47.3	26.0	10.7	5.0	3.1	3.1	1.5
Sun - Venus	44.2	18.8	7.7	9.9	3.1	4.2	1.3
Sun – Moon	53.0	6.8	3.0	2.2	1.6	1.9	1.4
Sun - Mars	49.3	9.9	6.2	3.4	2.6	3.1	1.4
Sun - Jupiter	51.2	7.7	5.2	2.7	0.8	1.6	1.4
Sun - Saturn	50.7	10.7	4.7	4.9	1.6	1.4	1.4
Sun – Uranus	54.5	3.1	1.1	2.4	2.0	0.8	1.5
Sun – Neptune	51.1	3.5	1.9	3.9	2.3	1.0	1.4
Mercury–Venus	42.6	24.3	11.5	6.2	3.4	1.9	1.4
Mercury - Moon	53.8	5.3	3.4	2.0	2.2	1.9	1.5
Mercury – Mars	46.6	14.1	6.8	4.3	2.9	2.9	1.3
Mercury- Jupiter	50.1	8.0	4.6	2.6	2.6	1.5	1.4
Mercury- Saturn	49.9	10.6	5.4	3.8	1.9	2.9	1.4
Mercury-Uranus	52.4	4.3	2.9	2.0	2.6	2.9	1.4
Mercury-Neptune	48.8	4.3	4.5	3.8	4.1	2.7	1.3
Venus-Moon	54.7	4.5	2.9	2.9	2.9	1.1	1.5
Venus- Mars	49.3	12.6	4.2	4.1	2.7	3.3	1.4
Venus- Jupiter	50.4	10.2	4.2	2.7	2.4	1.6	1.4
Venus- Saturn	52.0	8.7	6.1	4.2	2.2	1.5	1.4
Venus- Uranus	53.5	5.7	4.1	2.6	3.0	2.0	1.5
Venus – Neptune	50.1	6.8	5.8	4.3	3.5	1.1	1.4
Moon-Mars	47.0	9.5	3.8	2.0	2.4	1.6	1.3
Moon - Jupiter	52.7	7.2	3.5	2.6	1.8	1.1	1.4
Moon - Saturn	55.4	7.3	3.7	2.7	1.5	1.0	1.5
Moon - Uranus	50.3	11.8	3.5	1.8	2.6	1.8	1.4
Moon – Neptune	51.2	8.8	4.5	3.8	3.3	2.4	1.4
Mars - Jupiter	48.9	5.2	2.9	1.8	1.9	1.8	1.3
Mars - Saturn	53.3	4.7	2.3	2.6	1.9	0.8	1.5
Mars – Uranus	52.9	4.2	4.2	1.6	1.9	2.4	1.4
Mars – Neptune	50.1	5.2	2.6	3.8	2.6	2.6	1.4
Jupiter - Saturn	46.1	8.9	3.8	2.6	1.2	2.2	1.3
Jupiter - Uranus	51.5	7.7	3.5	3.1	2.7	1.9	1.4
Jupiter - Neptune	49.2	9.4	4.9	3.9	2.9	3.7	1.4
Saturn – Uranus	58.4	4.3	2.2	0.4	1.1	1.0	1.6
Saturn – Neptune	55.8	3.0	2.2	0.5	1.5	1.2	1.5
Uranus – Neptune	67.6	23.0	1.9	1.9	0.0	0.8	2.0

3.2 Cyclone Category - Deep Depression (DD)

Aspect frequencies of six hourly cyclone category 'DD' were ranged from 0 to 67.6 per cent, with a standard error of 1.3 to 2.0. Among the 36 conjunction, highest cyclone category 'DD' were observed between 0 - 10 degrees aspect (Table 3). Among the 36 conjunction, the highest six hourly cyclone category 'DD' were observed in the Uranus – Neptune (67.6%), Saturn – Uranus (58.4%), Saturn – Neptune (55.8%), Moon – Saturn (55.4%), Venus – Moon (54.7%), Sun – Uranus (54.5%), Mercury – Moon (53.8%), Venus – Uranus (53.5%), Mars – Saturn (53.3%) and Sun – Moon (53.0), Mars – Uranus (52.9%), Moon – Jupiter (52.7%), Mercury – Uranus (52.4%), Venus – Saturn (52.0%), Jupiter – Uranus (51.5%), Sun – Jupiter, Moon - Neptune at 51.2%, Sun – Neptune (51.1%), Sun – Saturn (50.7%), Venus – Jupiter (50.4%), Moon – Uranus (50.3%), Mercury – Jupiter, Venus – Neptune and Mars – Neptune (50.1%) aspect at

0 - 10 degrees. Among the 36 aspect degree groups and irrespective of planet aspect combinations, most cyclone category 'DD' were observed in 0 - 30 degree. In all aspect combinations, the cyclone category 'DD' were negatively correlated with increase in aspect angle above 30 degrees.

3.3 Cyclone Events – Cyclonic Storm (CS)

Aspect frequencies of cyclone category 'CS' were ranging from 0 to 64.8 per cent, with a standard error of 1.2 to 1.9. Among the 36 conjunction, the highest cyclone category 'CS' was observed between 0 and 10-degrees aspect (Table 4). Among the 36 conjunction, the highest number of cyclone category 'CS' were observed in the Uranus - Neptune (64.8%), followed by Sun – Mars (55.3%), Sun – Saturn (52.9%), Mercury – Mars (52.8%), Sun – Moon (52.6%), Venus – Saturn (52.5%), Jupiter – Saturn (52.0%), Sun – Mercury, Mercury – Saturn, Venus – Moon and Venus – Mars at 51.8% and Sun – Venus (51.7%), Mercury – Moon (51.2%), Saturn – Uranus (51.0%), Moon – Saturn (50.%), Sun – Jupiter, Mercury - Venus (50.1%) aspect at 0 - 10 degrees.

Table 3. Aspect frequency (%) of cyclone category deep depression (DD)

Aspect Angle	Two planet aspect (Degree) with cyclone eye as origin						
	1–10	11–20	21–30	31–40	41–50	51–60	SE
Sun - Mercury	47.3	26.0	10.7	5.0	3.1	3.1	1.5
Sun - Venus	44.2	18.8	7.7	9.9	3.1	4.2	1.3
Sun – Moon	53.0	6.8	3.0	2.2	1.6	1.9	1.4
Sun - Mars	49.3	9.9	6.2	3.4	2.6	3.1	1.4
Sun - Jupiter	51.2	7.7	5.2	2.7	0.8	1.6	1.4
Sun - Saturn	50.7	10.7	4.7	4.9	1.6	1.4	1.4
Sun – Uranus	54.5	3.1	1.1	2.4	2.0	0.8	1.5
Sun – Neptune	51.1	3.5	1.9	3.9	2.3	1.0	1.4
Mercury–Venus	42.6	24.3	11.5	6.2	3.4	1.9	1.4
Mercury - Moon	53.8	5.3	3.4	2.0	2.2	1.9	1.5
Mercury – Mars	46.6	14.1	6.8	4.3	2.9	2.9	1.3
Mercury- Jupiter	50.1	8.0	4.6	2.6	2.6	1.5	1.4
Mercury- Saturn	49.9	10.6	5.4	3.8	1.9	2.9	1.4
Mercury-Uranus	52.4	4.3	2.9	2.0	2.6	2.9	1.4
Mercury-Neptune	48.8	4.3	4.5	3.8	4.1	2.7	1.3
Venus-Moon	54.7	4.5	2.9	2.9	2.9	1.1	1.5
Venus- Mars	49.3	12.6	4.2	4.1	2.7	3.3	1.4
Venus- Jupiter	50.4	10.2	4.2	2.7	2.4	1.6	1.4
Venus- Saturn	52.0	8.7	6.1	4.2	2.2	1.5	1.4
Venus- Uranus	53.5	5.7	4.1	2.6	3.0	2.0	1.5
Venus – Neptune	50.1	6.8	5.8	4.3	3.5	1.1	1.4
Moon-Mars	47.0	9.5	3.8	2.0	2.4	1.6	1.3
Moon - Jupiter	52.7	7.2	3.5	2.6	1.8	1.1	1.4
Moon - Saturn	55.4	7.3	3.7	2.7	1.5	1.0	1.5
Moon - Uranus	50.3	11.8	3.5	1.8	2.6	1.8	1.4
Moon – Neptune	51.2	8.8	4.5	3.8	3.3	2.4	1.4
Mars - Jupiter	48.9	5.2	2.9	1.8	1.9	1.8	1.3
Mars - Saturn	53.3	4.7	2.3	2.6	1.9	0.8	1.5
Mars – Uranus	52.9	4.2	4.2	1.6	1.9	2.4	1.4
Mars – Neptune	50.1	5.2	2.6	3.8	2.6	2.6	1.4
Jupiter - Saturn	46.1	8.9	3.8	2.6	1.2	2.2	1.3
Jupiter - Uranus	51.5	7.7	3.5	3.1	2.7	1.9	1.4
Jupiter - Neptune	49.2	9.4	4.9	3.9	2.9	3.7	1.4
Saturn – Uranus	58.4	4.3	2.2	0.4	1.1	1.0	1.6
Saturn – Neptune	55.8	3.0	2.2	0.5	1.5	1.2	1.5
Uranus – Neptune	67.6	23.0	1.9	1.9	0.0	0.8	2.0

Table 4. Aspect frequency (%) of cyclone category cyclonic storm (CS)

Aspect Angle	Two planet aspect (Degree) with cyclone eye as origin						
	1–10	11–20	21–30	31–40	41–50	51–60	SE
Sun - Mercury	51.8	28.5	6.5	3.5	3.7	1.0	1.6
Sun - Venus	51.7	17.6	10.3	3.5	2.4	2.7	1.5
Sun – Moon	52.6	10.5	3.3	3.8	2.7	1.3	1.5
Sun - Mars	55.3	10.1	6.0	3.2	1.4	2.4	1.5
Sun - Jupiter	50.1	7.9	6.5	2.7	2.2	1.3	1.4
Sun - Saturn	52.9	6.2	3.2	1.4	1.1	1.9	1.5
Sun – Uranus	47.7	6.8	3.5	4.1	2.9	2.9	1.3
Sun – Neptune	44.2	7.5	6.0	7.5	3.0	2.2	1.2
Mercury–Venus	50.1	17.9	10.8	5.4	4.0	1.3	1.5
Mercury - Moon	51.2	9.8	5.7	3.5	3.0	1.7	1.4
Mercury – Mars	52.8	11.3	6.2	3.5	3.5	2.5	1.5
Mercury- Jupiter	49.8	8.9	5.2	4.4	2.9	1.0	1.4
Mercury- Saturn	51.8	7.5	2.7	3.2	2.4	2.2	1.4
Mercury-Uranus	46.9	8.7	5.9	2.5	4.6	3.2	1.3
Mercury-Neptune	43.3	10.0	7.9	6.8	4.8	3.0	1.2
Venus-Moon	51.8	9.8	5.9	3.3	2.4	2.2	1.4
Venus- Mars	51.8	15.4	5.1	1.9	2.5	1.6	1.5
Venus- Jupiter	48.8	12.0	5.4	3.5	2.2	2.2	1.4
Venus- Saturn	52.5	3.8	2.9	3.5	1.7	1.1	1.4
Venus- Uranus	45.8	9.4	5.9	5.2	5.1	2.2	1.3
Venus – Neptune	42.3	12.0	10.0	5.6	4.1	2.2	1.2
Moon-Mars	49.0	9.0	3.2	2.5	2.7	2.1	1.3
Moon - Jupiter	48.5	11.9	4.8	2.7	1.9	1.0	1.4
Moon - Saturn	50.6	6.3	2.9	1.6	2.4	1.6	1.4
Moon - Uranus	47.7	12.2	3.7	3.3	2.1	1.9	1.3
Moon – Neptune	45.6	11.7	5.1	4.9	3.0	2.2	1.3
Mars - Jupiter	48.2	6.2	5.2	2.5	3.3	1.7	1.3
Mars - Saturn	49.6	5.1	3.8	2.7	2.2	1.4	1.4
Mars – Uranus	47.9	5.4	6.5	4.4	3.2	1.4	1.3
Mars – Neptune	45.2	7.8	5.9	5.9	2.4	1.6	1.2
Jupiter - Saturn	52.0	6.3	1.9	2.5	1.7	3.0	1.4
Jupiter - Uranus	47.4	10.8	4.6	2.9	4.0	1.4	1.3
Jupiter - Neptune	47.1	11.4	7.1	1.7	1.7	2.7	1.3
Saturn – Uranus	51.0	4.8	3.5	1.0	1.0	0.5	1.4
Saturn – Neptune	48.7	4.0	3.3	1.9	2.1	2.4	1.3
Uranus – Neptune	64.8	24.9	4.1	0.8	0.3	0.6	1.9

3.4 Cyclone Events – Severe Cyclonic Storm (SCS)

Aspect frequencies of 'SCS' category was ranged from 0 to 66.8 per cent, with a standard error of 1.3 to 2.0. Among the 36 conjunction, the highest cyclone category 'SCS' were observed between 0 and 10-degrees aspect. Among the 36 conjunction, highest number of cyclone category 'SCS' were observed in the Uranus - Neptune (66.8%), Sun – Mercury, Jupiter – Neptune at 56.0%, Sun – Saturn (53.9%), Venus – Jupiter (53.4%), Venus – Moon (52.9%), Sun – Mars, Venus – Saturn, Jupiter – Uranus at 52.3%, Jupiter – Saturn (51.3%), Sun – Jupiter (50.8%), Venus – Uranus, Venus – Neptune, Mars – Jupiter at 50.3% aspect at 0 - 10 degrees. The findings were clearly depicted in Table 5.

3.5 Cyclone Events – Very Severe Cyclonic Storm (VSCS)

Aspect frequencies of cyclone category 'VSCS' was ranged from 0 to 68.3 per cent, with a standard error of 1.1 to 2.0. Among the 36 conjunction, the highest cyclone category 'VSCS' were observed between 0 and 10-degrees aspect. Among the 36 conjunction, the highest number of cyclone category 'VSCS' were observed in the Uranus – Neptune (68.3%), Sun – Saturn (57.1%), Venus – Jupiter, Mars –

Jupiter at 56.1%, Sun – Jupiter, Venus – Saturn at 55.6%, Moon – Saturn (55.0%), Mercury – Saturn (54.5%), Sun – Mercury (54.0%), Sun – Mars, Moon – Jupiter at 53.4%, Sun – Venus, Mercury – Jupiter, Venus – Moon at 52.9%, Mercury – Venus, Mars – Saturn at 51.9, Sun – Moon, Mercury – Mars and Moon – Mars at 50.3% aspect at 0 - 10 degrees (Table 6).

3.6 Cyclone Events – Extremely Severe Cyclonic Storm (ESCS)

Aspect frequencies of cyclone category 'ESCS' were ranged from 0 to 64.7 per cent, with a standard error of 1.1 to 1.9. Among the 36 conjunction, the highest number of cyclone category 'ESCS' were observed between 0 and 10-degrees aspect. Among the conjunction, the highest six hourly cyclone category 'VSCS' were observed in the Uranus – Neptune (64.7%), Mars – Jupiter (56.9%), Saturn – Uranus (55.2%), Saturn – Neptune (54.3%), Sun – Jupiter, Venus – Jupiter, Venus –Saturn, Mars – Uranus at 53.5%, Mars – Neptune (51.7%), Mercury – Jupiter, Venus – Moon, Venus – Uranus at 50.9%, Sun – Uranus (50.0%) aspect at 0 - 10 degrees (Table 7).

Table 5. Aspect frequency (%) of cyclone category severe cyclonic storm (SCS)

Aspect Angle	Two planet aspect (Degree) with cyclone eye as origin						
	1–10	11–20	21–30	31–40	41–50	51–60	SE
Sun - Mercury	56.0	24.9	7.3	3.6	1.6	1.6	1.7
Sun - Venus	46.1	22.3	9.3	2.6	4.7	3.6	1.4
Sun – Moon	49.7	8.8	6.7	3.6	2.6	0.5	1.4
Sun - Mars	52.3	5.7	9.8	3.6	4.2	2.6	1.5
Sun - Jupiter	50.8	5.2	5.7	2.1	2.1	1.0	1.4
Sun - Saturn	53.9	8.8	3.6	1.6	2.6	3.1	1.5
Sun – Uranus	48.2	4.7	2.1	5.2	0.5	1.6	1.3
Sun – Neptune	47.2	4.2	5.2	5.7	2.1	4.7	1.3
Mercury–Venus	48.2	14.0	9.3	4.2	6.2	2.1	1.4
Mercury - Moon	48.7	7.8	5.7	2.6	4.2	2.1	1.3
Mercury – Mars	49.2	10.9	8.3	3.1	5.7	4.2	1.4
Mercury- Jupiter	49.7	6.2	5.2	2.1	2.6	0.5	1.4
Mercury- Saturn	49.7	13.0	4.7	3.6	1.0	2.1	1.4
Mercury-Uranus	48.7	5.7	3.1	4.2	1.0	3.6	1.3
Mercury-Neptune	46.1	8.3	4.7	4.2	3.6	6.2	1.3
Venus-Moon	52.9	8.3	5.2	3.1	2.1	2.6	1.5
Venus- Mars	46.6	13.5	5.7	4.7	3.1	3.1	1.3
Venus- Jupiter	53.4	6.2	2.6	2.6	0.5	1.0	1.5
Venus- Saturn	52.3	7.3	2.1	4.2	3.6	0.5	1.4
Venus- Uranus	50.3	7.8	5.2	3.1	2.6	1.6	1.4
Venus – Neptune	50.3	6.7	8.3	7.8	4.2	1.6	1.4
Moon-Mars	45.1	11.9	5.2	3.1	2.6	1.6	1.3
Moon - Jupiter	45.1	9.3	6.7	2.1	1.0	3.1	1.3
Moon - Saturn	49.7	4.7	3.1	3.6	3.1	2.6	1.4
Moon - Uranus	45.1	11.9	4.7	3.6	1.6	2.1	1.3
Moon – Neptune	46.6	15.0	3.6	3.6	1.0	2.1	1.3
Mars - Jupiter	50.3	6.2	2.6	3.1	1.0	1.6	1.4
Mars - Saturn	48.2	6.2	3.1	6.2	3.6	2.6	1.3
Mars – Uranus	49.7	5.7	3.6	1.6	2.1	2.1	1.4
Mars – Neptune	49.7	7.8	4.2	1.0	3.1	1.6	1.4
Jupiter - Saturn	51.3	7.3	1.6	1.6	3.1	1.6	1.4
Jupiter - Uranus	52.3	12.4	2.6	1.0	3.1	2.1	1.5
Jupiter - Neptune	56.0	8.8	3.6	2.1	2.1	2.6	1.5
Saturn – Uranus	49.2	6.2	3.1	2.1	0.0	1.6	1.4
Saturn – Neptune	49.2	5.2	2.6	1.0	1.0	2.6	1.3
Uranus – Neptune	66.8	26.9	1.6	1.0	0.5	0.5	2.0

Table 6. Aspect frequency (%) of cyclone category very severe cyclonic storm (VSCS)

Aspect Angle	Two planet aspect (Degree) with cyclone eye as origin						
	1–10	11–20	21–30	31–40	41–50	51–60	SE
Sun - Mercury	54.0	26.5	6.9	3.7	2.1	0.5	1.6
Sun - Venus	52.9	22.2	9.0	2.7	1.6	2.1	1.6
Sun – Moon	50.3	11.1	5.3	1.1	3.2	2.1	1.4
Sun - Mars	53.4	5.8	9.0	2.7	1.6	2.1	1.5
Sun - Jupiter	55.6	3.2	4.2	2.7	0.0	1.6	1.5
Sun - Saturn	57.1	6.9	2.7	0.5	1.6	4.2	1.6
Sun – Uranus	46.6	9.0	3.2	7.9	0.5	3.2	1.3
Sun – Neptune	43.4	7.4	7.9	6.4	4.8	1.6	1.2
Mercury–Venus	51.9	14.8	11.1	6.9	2.7	1.1	1.5
Mercury - Moon	46.6	10.6	4.8	4.2	3.7	1.6	1.3
Mercury – Mars	50.3	6.9	10.1	5.3	3.7	3.2	1.4
Mercury- Jupiter	52.9	3.7	1.6	6.4	2.7	0.5	1.5
Mercury- Saturn	54.5	9.5	2.7	3.2	3.7	1.6	1.5
Mercury-Uranus	44.4	7.9	6.4	5.3	3.7	2.7	1.2
Mercury-Neptune	41.3	7.9	8.5	6.9	2.7	6.9	1.2
Venus-Moon	52.9	7.9	4.2	3.7	3.2	1.6	1.5
Venus- Mars	48.2	10.1	5.3	2.1	4.2	1.6	1.3
Venus- Jupiter	56.1	4.2	1.6	2.7	1.1	2.7	1.5
Venus- Saturn	55.6	6.4	1.1	3.2	3.2	2.1	1.5
Venus- Uranus	47.1	12.7	5.8	2.1	3.7	2.1	1.3
Venus – Neptune	45.0	11.6	10.1	3.2	5.3	1.6	1.3
Moon-Mars	50.3	10.1	5.3	1.1	1.1	0.5	1.4
Moon - Jupiter	53.4	5.8	6.9	1.1	0.5	2.7	1.5
Moon - Saturn	55.0	5.3	1.6	1.6	1.1	0.0	1.5
Moon - Uranus	36.0	15.9	12.2	4.8	5.8	2.1	1.1
Moon – Neptune	41.3	24.3	6.9	4.2	1.1	1.1	1.3
Mars - Jupiter	56.1	3.2	1.6	0.5	1.1	1.6	1.5
Mars - Saturn	51.9	5.3	4.8	5.3	5.3	0.5	1.4
Mars – Uranus	46.0	3.7	6.4	4.8	2.7	2.1	1.3
Mars – Neptune	42.9	7.9	4.2	3.7	3.2	1.6	1.2
Jupiter - Saturn	45.5	7.9	3.2	5.8	1.6	2.1	1.3
Jupiter - Uranus	45.0	11.1	2.1	2.7	3.7	2.7	1.3
Jupiter - Neptune	42.9	8.5	9.0	4.8	0.5	1.6	1.2
Saturn – Uranus	47.6	5.8	3.2	1.6	1.1	0.5	1.3
Saturn – Neptune	44.4	6.4	2.7	1.6	1.6	3.7	1.2
Uranus – Neptune	68.3	23.8	2.1	0.0	0.0	0.5	2.0

3.7 Cyclone Events – Supper Cyclonic Storm (SUCS)

Aspect frequencies of cyclone category 'SUCS' was ranged from 0 to 76.9 per cent, with a standard error of 1.0 to 2.2. Among the 36 conjunction, the highest number of cyclone category 'SUCS' were observed between 0 and 10-degrees aspect. Among the conjunction, the highest number of cyclone category 'SUCS' were observed in the Saturn- Uranus and Saturn – Neptune (76.9%) followed by Sun – Saturn, Venus – Saturn, Moon – Jupiter at 69.2%, Sun-Mercury, Sun – Venus, Sun – Moon, Sun – Uranus, Mercury – Saturn, Venus – Moon, Venus – Uranus and Jupiter – Uranus at 61.5%, Sun – Mars, Sun – Neptune, Mercury – Moon, Mercury – Uranus, Venus – Neptune, Moon – Mars, Moon – Saturn, Mars – Saturn and Jupiter – Neptune at 53.9% aspects at 0 - 10 degrees. Compared to the cyclone category D, decrease in frequency of six hourly cyclone category 'SUCS' was observed in 0 - 10 degree aspect of all other combinations. Irrespective of all other cyclone categories, category 'SUCS' had least influence by Uranus – Neptune (46.2%) aspect at 0 - 10 degrees (Table 8).

Table 7. Aspect frequency (%) of cyclone category extremely severe cyclonic storm (ESCS)

Aspect Angle	Two planet aspect (Degree) with cyclone eye as origin						
	1–10	11–20	21–30	31–40	41–50	51–60	SE
Sun - Mercury	48.3	28.5	6.9	5.2	6.0	0.0	1.5
Sun - Venus	45.7	20.7	5.2	5.2	6.0	1.7	1.4
Sun – Moon	48.3	10.3	6.9	3.5	2.6	2.6	1.3
Sun - Mars	48.3	9.5	4.3	2.6	3.5	5.2	1.3
Sun - Jupiter	53.5	6.9	7.8	3.5	4.3	1.7	1.5
Sun - Saturn	45.7	9.5	10.3	5.2	1.7	3.5	1.3
Sun – Uranus	50.0	6.9	0.0	1.7	4.3	0.0	1.4
Sun – Neptune	47.4	4.3	2.6	7.8	1.7	0.9	1.3
Mercury–Venus	44.8	24.1	8.6	4.3	6.0	2.6	1.4
Mercury - Moon	42.2	8.6	6.9	5.2	8.6	1.7	1.2
Mercury – Mars	45.7	8.6	7.8	3.5	5.2	4.3	1.3
Mercury- Jupiter	50.9	2.6	5.2	6.0	3.5	1.7	1.4
Mercury- Saturn	49.1	17.2	6.0	2.6	3.5	2.6	1.4
Mercury-Uranus	46.6	6.9	0.9	3.5	0.0	5.2	1.3
Mercury-Neptune	44.0	6.9	0.9	6.0	3.5	5.2	1.2
Venus-Moon	50.9	6.0	5.2	1.7	5.2	0.9	1.4
Venus- Mars	46.6	11.2	6.0	1.7	1.7	1.7	1.3
Venus- Jupiter	53.5	6.0	1.7	0.0	0.0	1.7	1.5
Venus- Saturn	53.5	16.4	3.5	5.2	0.0	1.7	1.5
Venus- Uranus	50.9	12.1	1.7	0.9	1.7	0.9	1.4
Venus – Neptune	48.3	12.1	3.5	1.7	0.0	1.7	1.4
Moon-Mars	46.6	1.7	6.0	0.9	2.6	2.6	1.3
Moon - Jupiter	47.4	10.3	6.9	2.6	0.9	0.9	1.3
Moon - Saturn	49.1	2.6	0.9	3.5	1.7	0.9	1.4
Moon - Uranus	40.5	11.2	2.6	4.3	4.3	6.9	1.2
Moon – Neptune	35.3	13.8	7.8	8.6	6.0	4.3	1.1
Mars - Jupiter	56.9	3.5	0.9	1.7	0.0	1.7	1.6
Mars - Saturn	49.1	8.6	5.2	3.5	3.5	0.0	1.4
Mars – Uranus	53.5	4.3	4.3	0.9	0.9	0.9	1.5
Mars – Neptune	51.7	2.6	3.5	1.7	1.7	1.7	1.4
Jupiter - Saturn	46.6	5.2	3.5	1.7	0.9	3.5	1.3
Jupiter - Uranus	49.1	6.0	1.7	3.5	1.7	2.6	1.4
Jupiter - Neptune	47.4	5.2	5.2	3.5	3.5	1.7	1.3
Saturn – Uranus	55.2	6.0	0.9	0.9	1.7	0.0	1.5
Saturn – Neptune	54.3	4.3	0.0	0.9	1.7	3.5	1.5
Uranus – Neptune	64.7	28.5	1.7	0.0	0.0	0.0	1.9

Table 8. Aspect frequency (%) of cyclone category supper cyclonic storm (SUCS)

Aspect Angle	Two planet aspect (Degree) with cyclone eye as origin						
	1–10	11–20	21–30	31–40	41–50	51–60	SE
Sun - Mercury	61.5	7.7	15.4	7.7	0.0	0.0	1.8
Sun - Venus	61.5	7.7	0.0	7.7	0.0	0.0	1.7
Sun – Moon	61.5	7.7	0.0	0.0	0.0	0.0	1.7
Sun - Mars	53.9	0.0	0.0	0.0	7.7	7.7	1.5
Sun - Jupiter	46.2	0.0	0.0	7.7	0.0	0.0	1.4
Sun - Saturn	69.2	0.0	0.0	0.0	0.0	0.0	2.0
Sun – Uranus	61.5	0.0	0.0	0.0	0.0	7.7	1.8
Sun – Neptune	53.9	0.0	0.0	0.0	15.4	0.0	1.6
Mercury–Venus	46.2	7.7	15.4	0.0	0.0	7.7	1.4
Mercury - Moon	53.9	0.0	7.7	0.0	0.0	0.0	1.6
Mercury – Mars	38.5	15.4	7.7	15.4	0.0	0.0	1.2
Mercury- Jupiter	38.5	0.0	0.0	0.0	15.4	0.0	1.3

Aspect Angle	Two planet aspect (Degree) with cyclone eye as origin						
	1–10	11–20	21–30	31–40	41–50	51–60	SE
Mercury- Saturn	61.5	0.0	0.0	7.7	0.0	0.0	1.8
Mercury-Uranus	53.9	7.7	0.0	15.4	0.0	0.0	1.6
Mercury-Neptune	46.2	7.7	0.0	15.4	7.7	0.0	1.4
Venus-Moon	61.5	7.7	0.0	0.0	0.0	0.0	1.7
Venus- Mars	46.2	23.1	7.7	7.7	0.0	0.0	1.4
Venus- Jupiter	46.2	7.7	0.0	7.7	0.0	0.0	1.3
Venus- Saturn	69.2	7.7	0.0	0.0	0.0	0.0	2.0
Venus- Uranus	61.5	7.7	0.0	0.0	0.0	0.0	1.7
Venus – Neptune	53.9	7.7	0.0	0.0	7.7	0.0	1.5
Moon-Mars	53.9	0.0	0.0	0.0	0.0	0.0	1.6
Moon - Jupiter	69.2	0.0	0.0	7.7	0.0	0.0	1.9
Moon - Saturn	53.9	0.0	0.0	7.7	0.0	0.0	1.6
Moon - Uranus	46.2	7.7	0.0	7.7	7.7	7.7	1.3
Moon – Neptune	38.5	7.7	0.0	7.7	7.7	7.7	1.2
Mars - Jupiter	30.8	7.7	7.7	7.7	0.0	0.0	1.0
Mars - Saturn	53.9	7.7	0.0	0.0	0.0	0.0	1.5
Mars – Uranus	46.2	15.4	7.7	0.0	7.7	7.7	1.4
Mars – Neptune	38.5	23.1	0.0	15.4	7.7	0.0	1.3
Jupiter - Saturn	30.8	23.1	15.4	0.0	0.0	0.0	1.3
Jupiter - Uranus	61.5	7.7	7.7	0.0	0.0	0.0	1.7
Jupiter - Neptune	53.9	7.7	7.7	0.0	0.0	0.0	1.5
Saturn – Uranus	76.9	15.4	0.0	0.0	0.0	0.0	2.2
Saturn – Neptune	76.9	7.7	0.0	0.0	0.0	0.0	2.1
Uranus – Neptune	46.2	46.2	0.0	0.0	0.0	0.0	1.8

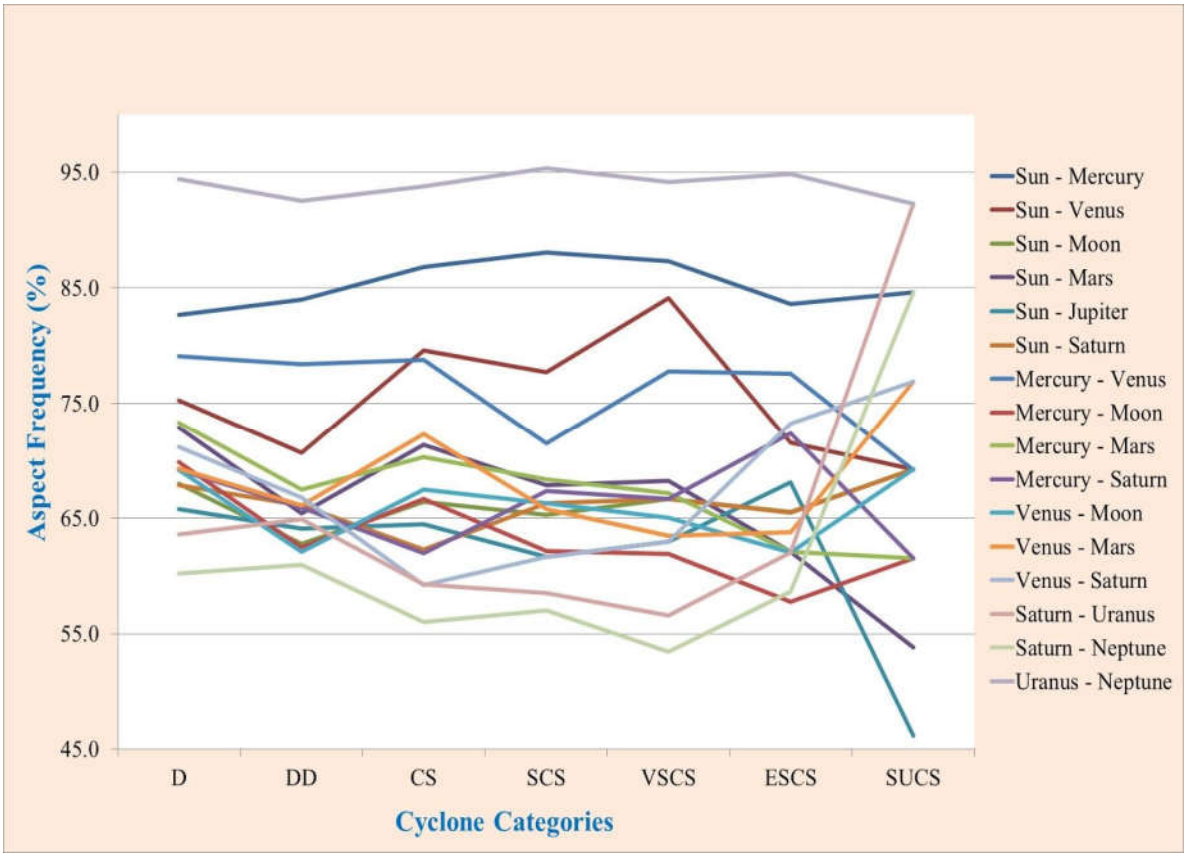

Fig. 1. Influence of two-planets aspect frequency on cyclone categories

4. DISCUSSION

Irrespective of the 36 combinations of aspects considered in this study, the cyclone events were mostly observed between 0 and 30 degree aspect. In all two planet aspect combinations, the cyclone events were negatively correlated with increase in aspect angle above 30 degrees. Among the 36 two planets aspects studied, the Uranus – Neptune and Sun – Mercury and Sun – Venus had higher influence on all the cyclone categories. The Sun – Mercury and Sun - Venus combination had increased from D to VSCS and then decreased towards SUCS (Fig. 1). Similar results were observed by Rathika and Dheebakaran, [10] for the different category of wind speed events and major heavy wind speed events had fall between the 0 – 30 degree aspects of any two planets. Major cyclone events were occurred in the aspect of 0 – 10 degrees, irrespective of planet combinations. In astrometeorology, the conjunction (0°) and parallel are considered to be very strong aspects on weather events [13]. Traditionally astrologers had considered “Pratiyuti” (angle of 180º ± 5), Yuti (angle of 0º ± 5) and Samakranti (same declination, 0º ± 1) are most powerful aspects for weather prediction [14]. The rainfall astrometeorological studies supported our study by inferring that the aspects of planet between 0 and 30 had high influence on the rainfall and other aspects had very minimum influence [7].

5. SUMMERY AND CONCLUSION

The study could be concluded that, major Cyclone events had occurred in the aspect of 0 – 10 degrees in precise and broadly 0 – 30 degree aspects any two planet combinations. Among the 36 two planet combinations, Uranus – Neptune and Sun – Mercury and Sun – Venus had higher influence on all the cyclone categories. The Sun – Mercury and Sun - Venus combination had increased from cyclone category D to VSCS. The Saturn – Uranus, Saturn - Neptune and Venus – Mars had low influence in early stages of Cyclone categories from D to ESCS but the influence was increased at stronger Cyclone categories viz., Very Severe Cyclone to Super Cyclone system.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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