IRI 2007 foF2 prediction at Ouagadougou station during quiet time periods from 1985 to 1995

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OUTILINE

Introduction

1. Geomagnetic classes of activity
2. foF2 different type profiles at African equatorial latitude
3. foF2 variability for quiet time periods from 1985-1995

Conclusion

INTRODUCTION-1

As:

- ionosphere is important in radio wave propagations, it will play an important role in Space weather study.

-geomagnetic activity is due to solar geoeffectiveness events

We focus our attention to ionosphere variability under different solar events

For now coasting or for forecasting ionosphere variability modeling is a best tools. To best model ionosphere variation it is necessary to test and improve existing models.

In this presentation we will present foF2 prediction of an semi empirical model IRI during quiet time period

Geomagnetic activity classification-1

Four classes of geomagnetic activity

(Legrand and Simon, 1989; Simon and Legrand, 1989; Richardson et al., 2000; Richardson and Can, 2002; Ouattara and Amory Mazaudier, 2009; Zerbo et al., 2012)

Quiet Activity: Slow solar wind

Recurrent activity: High speed solar wind

Shock activity : CMEs

Fluctuating activity or unclear activity: Fluctuating solar wind

Geomagnetic activity classification-2

Classification by means of pixel diagram of Aa index

Legrand and Simon, 1989; Simon and Legrand, 1989; Ouattara, 2009;

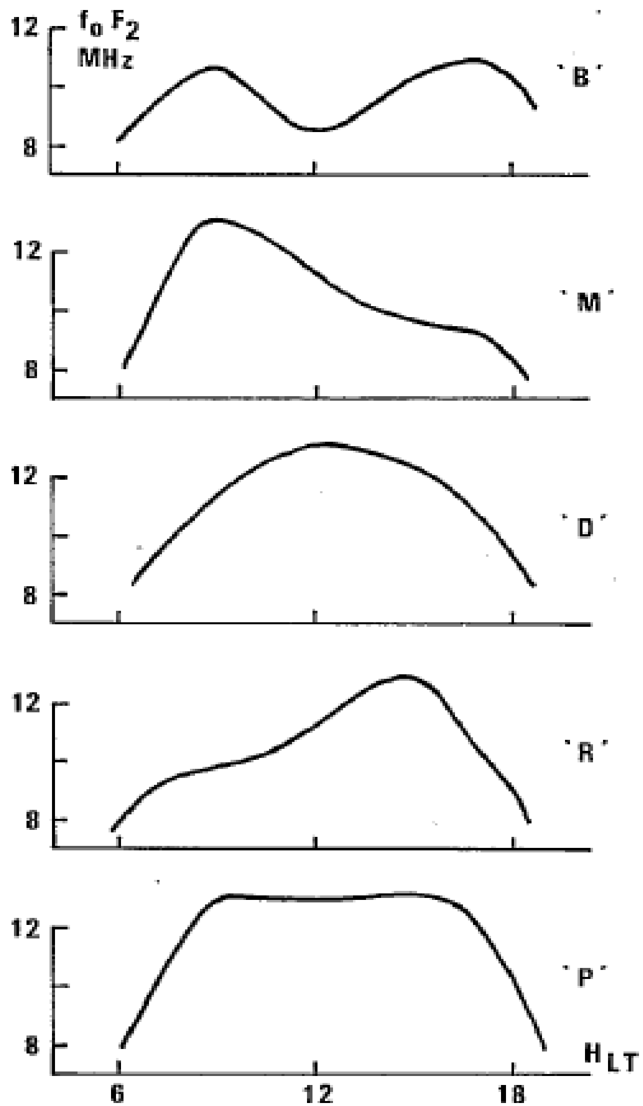
Ouattara and Amory Mazaudier, 2009;

Classification by means of pixel diagram of solar wind

Zerbo et al., 2012

Different types of hourly foF2 profiles in Africa equatorial region and associated electric current

Profile types	Electric current sources
Noon bite out	Strength electrojet
Morning peak	Mean electrojet
Dome	Absence of electrojet
Afternoon peak or Reversal	Intense conter electrojet
Plateau	Weak electrojet



Fayot and Vila, 1979

Vassal, 1982

Results -1: data treatment

Period : 1985-1995

Season: Spring (March); Summer (June); Autumn (September); Winter (December)

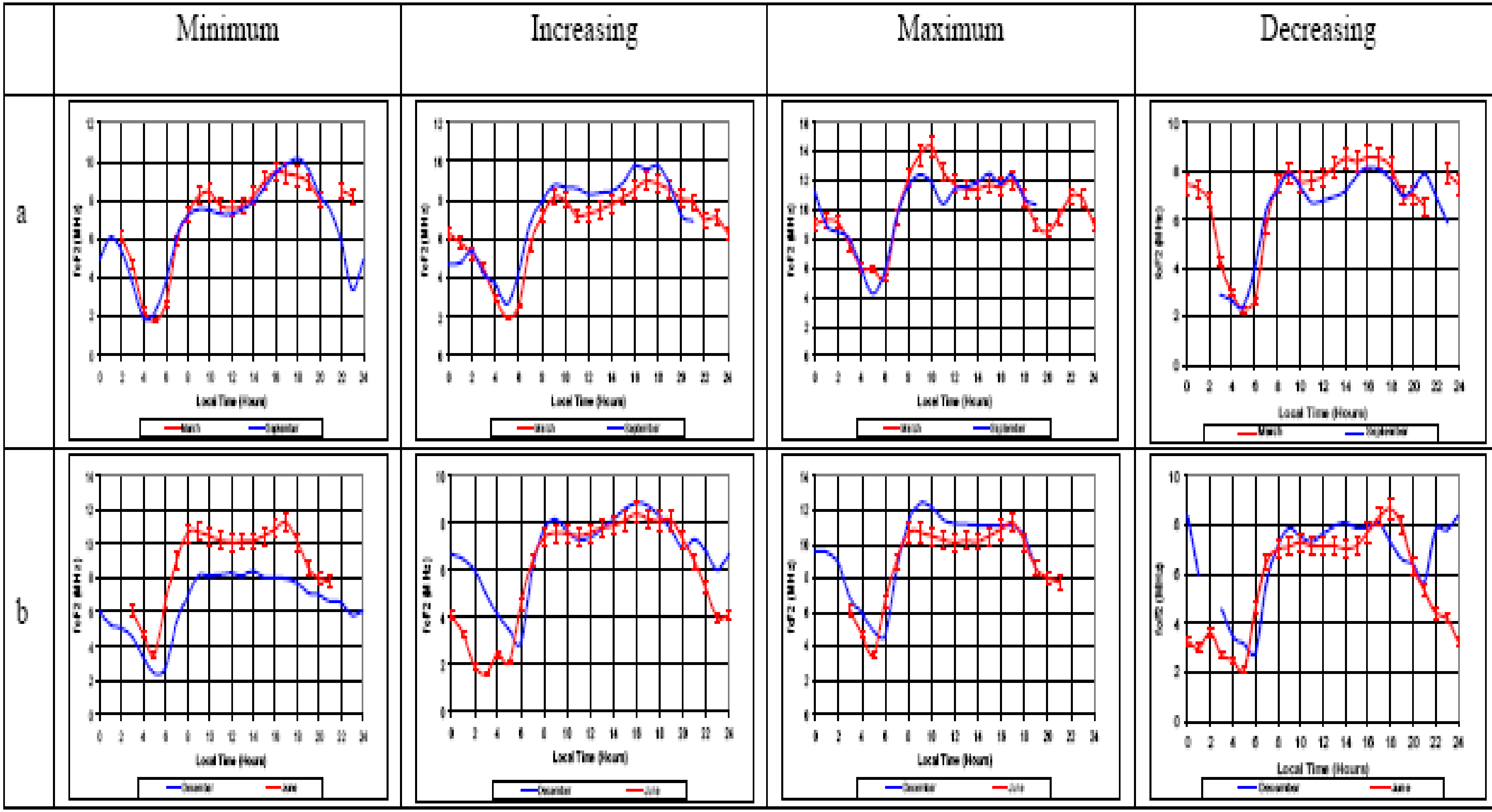
Solar cycle phase years: Minimum (1985); Increasing (1987); Maximum (1990); Decreasing (1994)

Quiet Days: Five quietest days of the choice months

Plots: Hourly mean values of each five quietest days

Results-2: Ionosphere variability

a: Red: March and Blue: September b: Red June and Blue December



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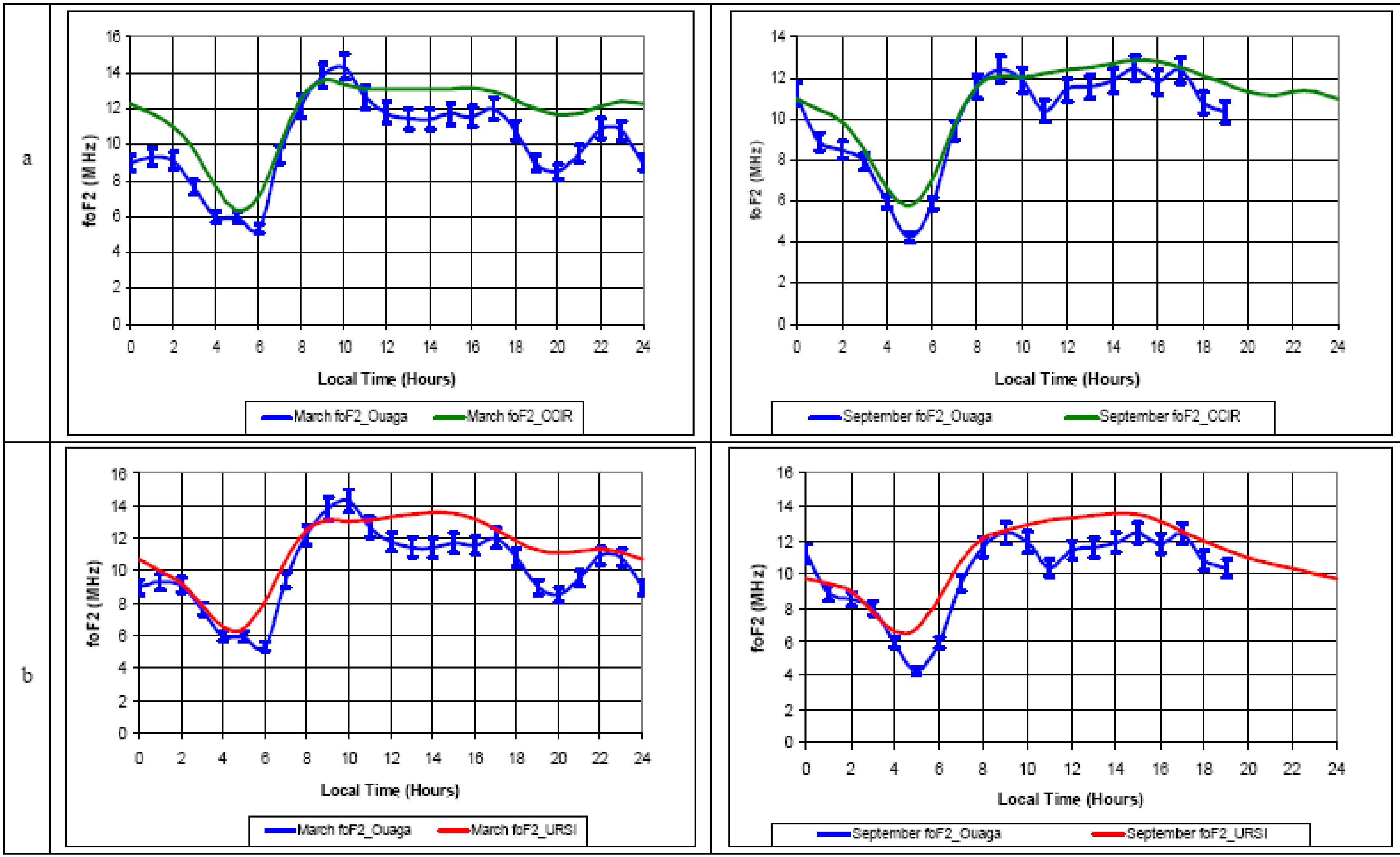
Same daytime patterns for equinox months and different daytime patterns for solstice

Results-3a: Comparison IRI -2007 and data:

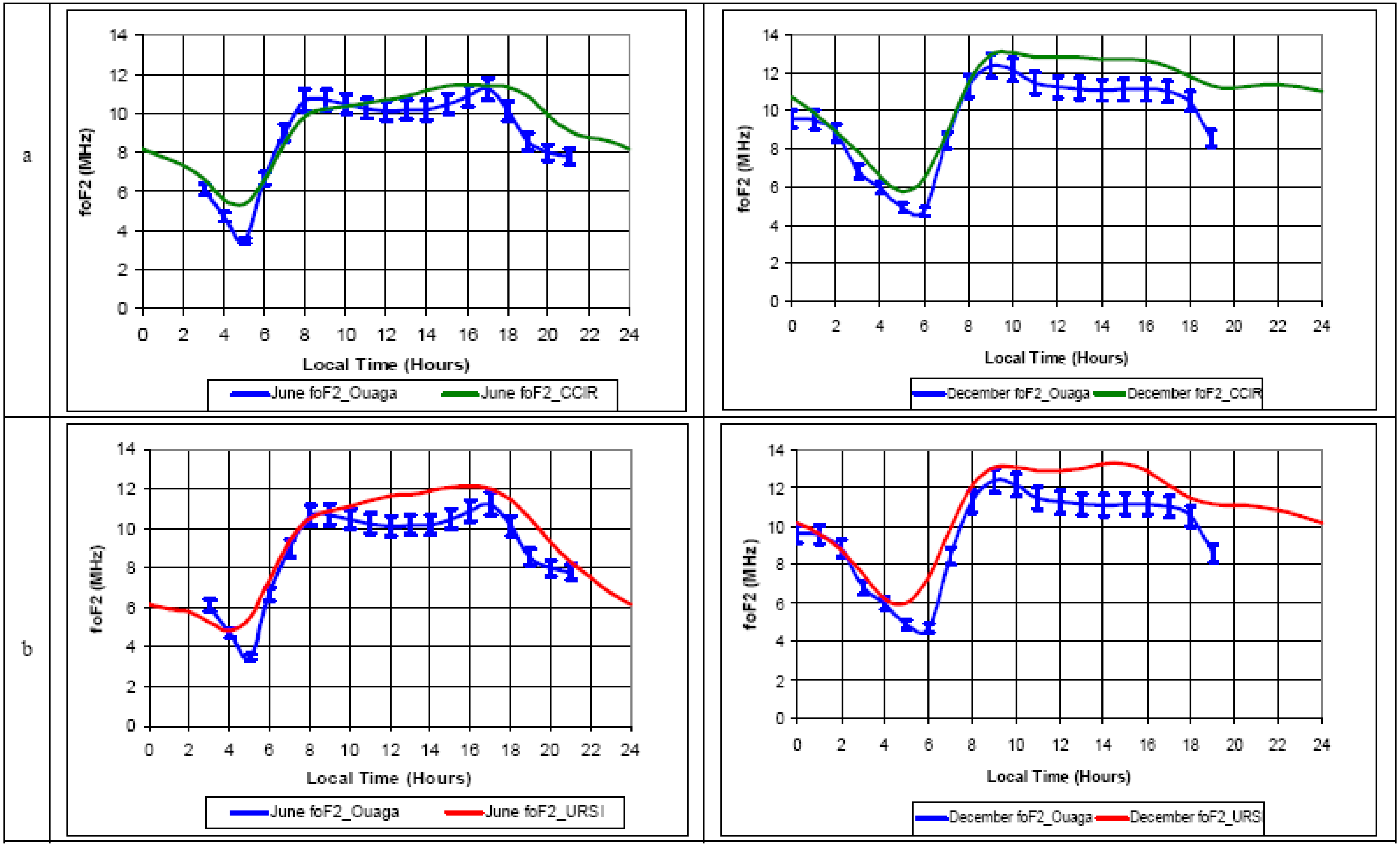
Solar maximum and Equinox months

Blue: Data; Green CCIR (Comité Consultatif International des Radio communications) and Red URSI (Union Radio Scientifique Internationale)



Results-3b: Comparison IRI -2007 and data:

Solar maximum and Solstice months



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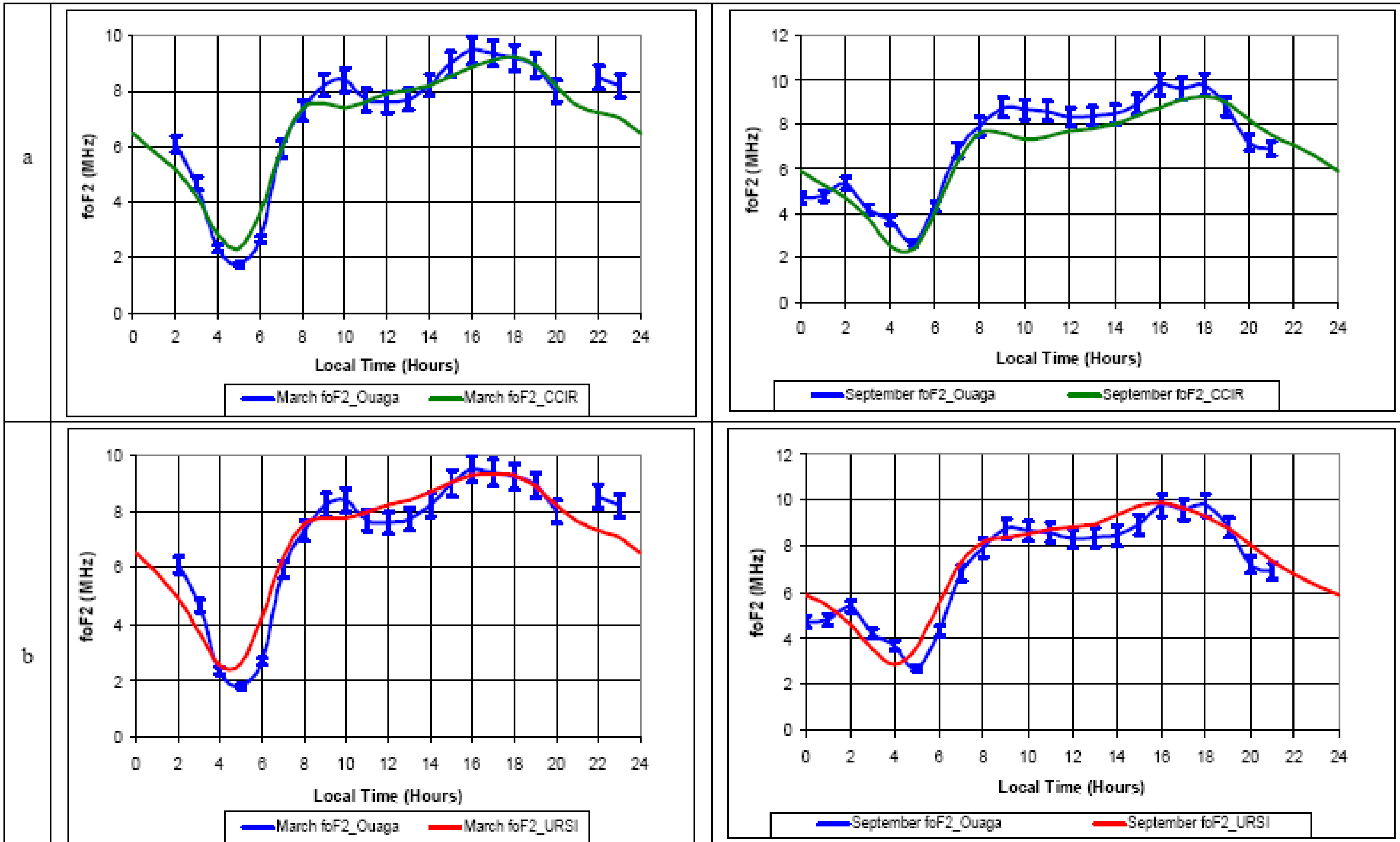
Results-4a: Comparison IRI -2007 and data:
Solar minimum and Equinox months



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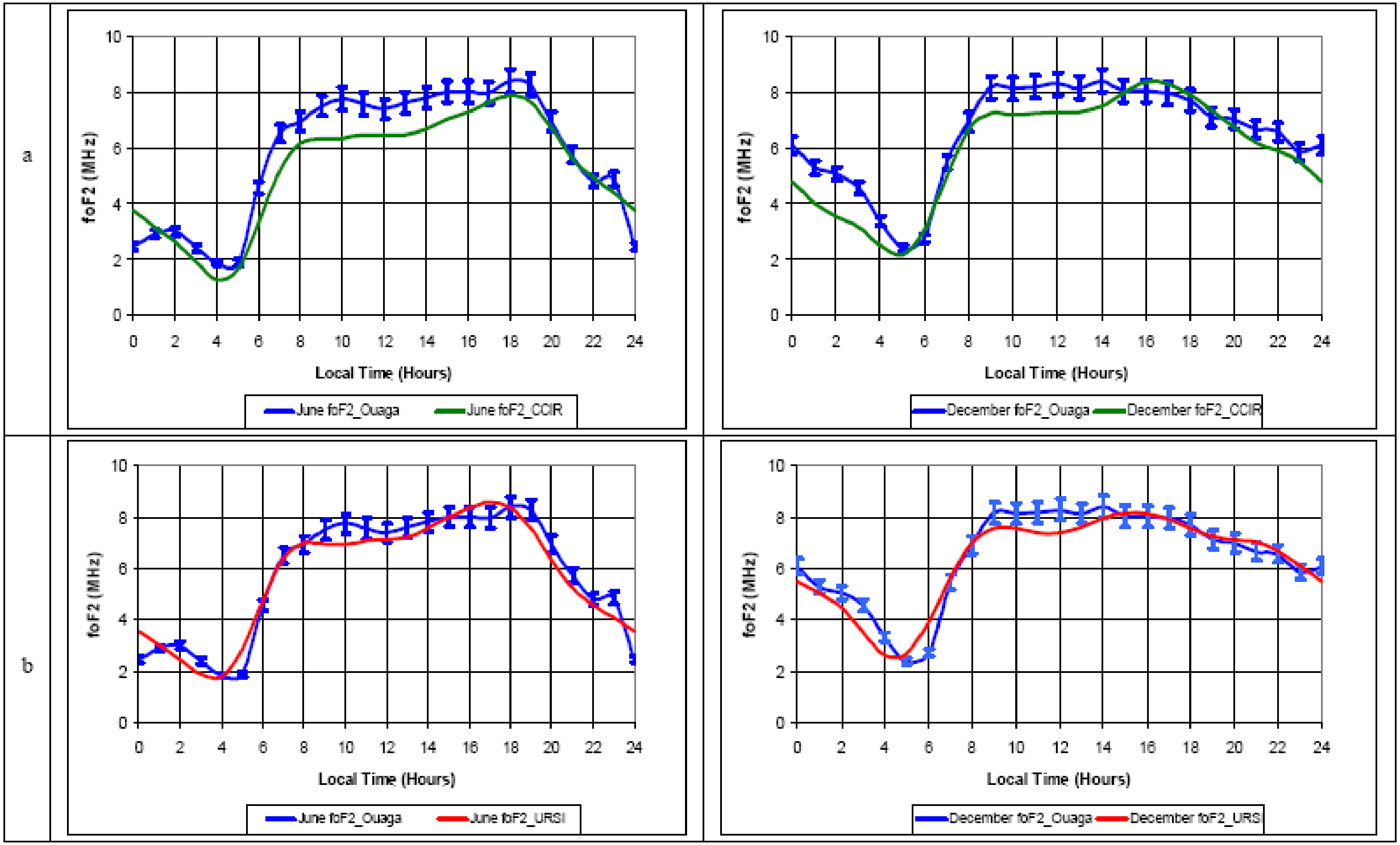
Results-4b: Comparison IRI -2007 and data:

Solar minimum and Solstice months



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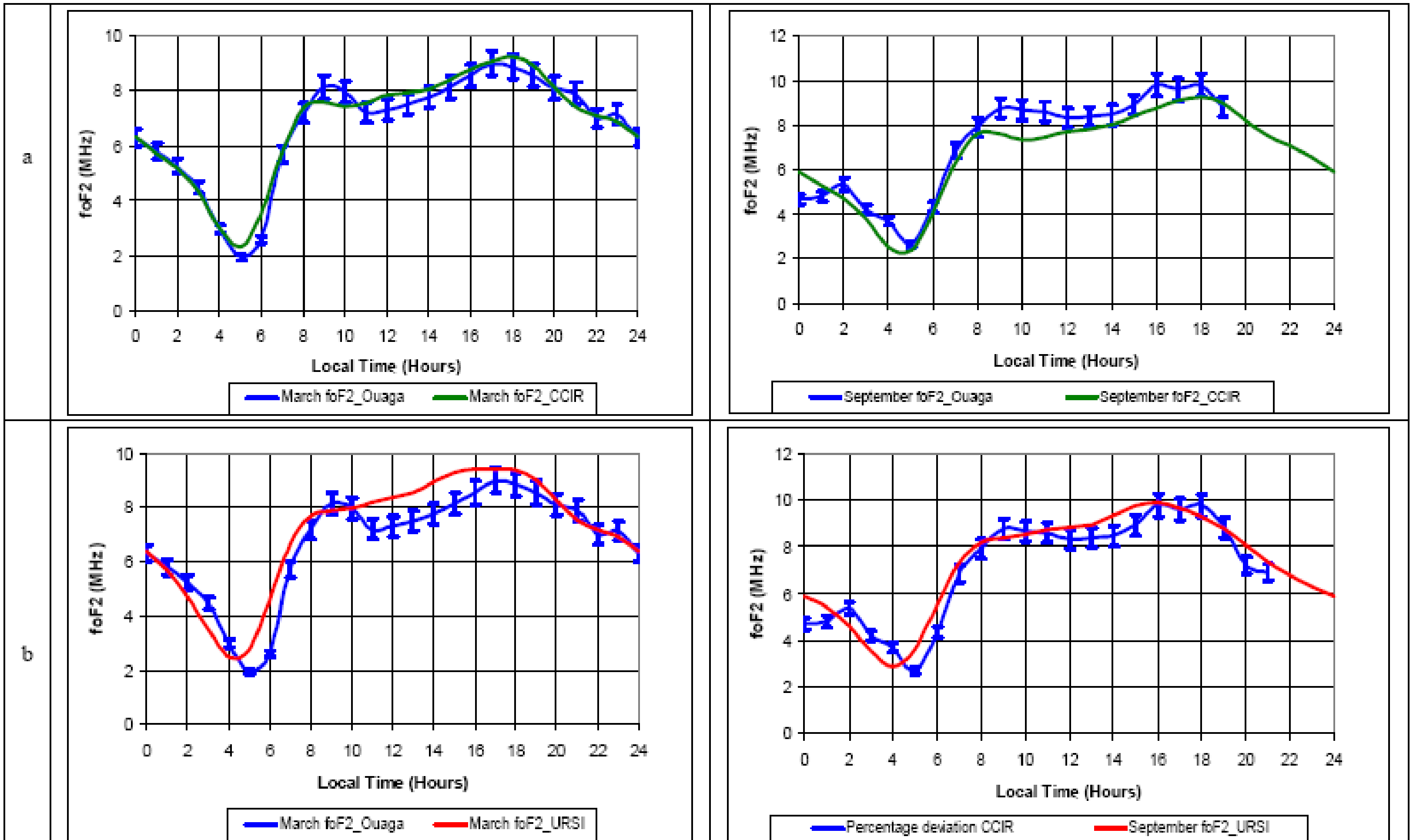
Results-5a: Comparison IRI -2007 and data:

Solar increasing phase and Equinox months



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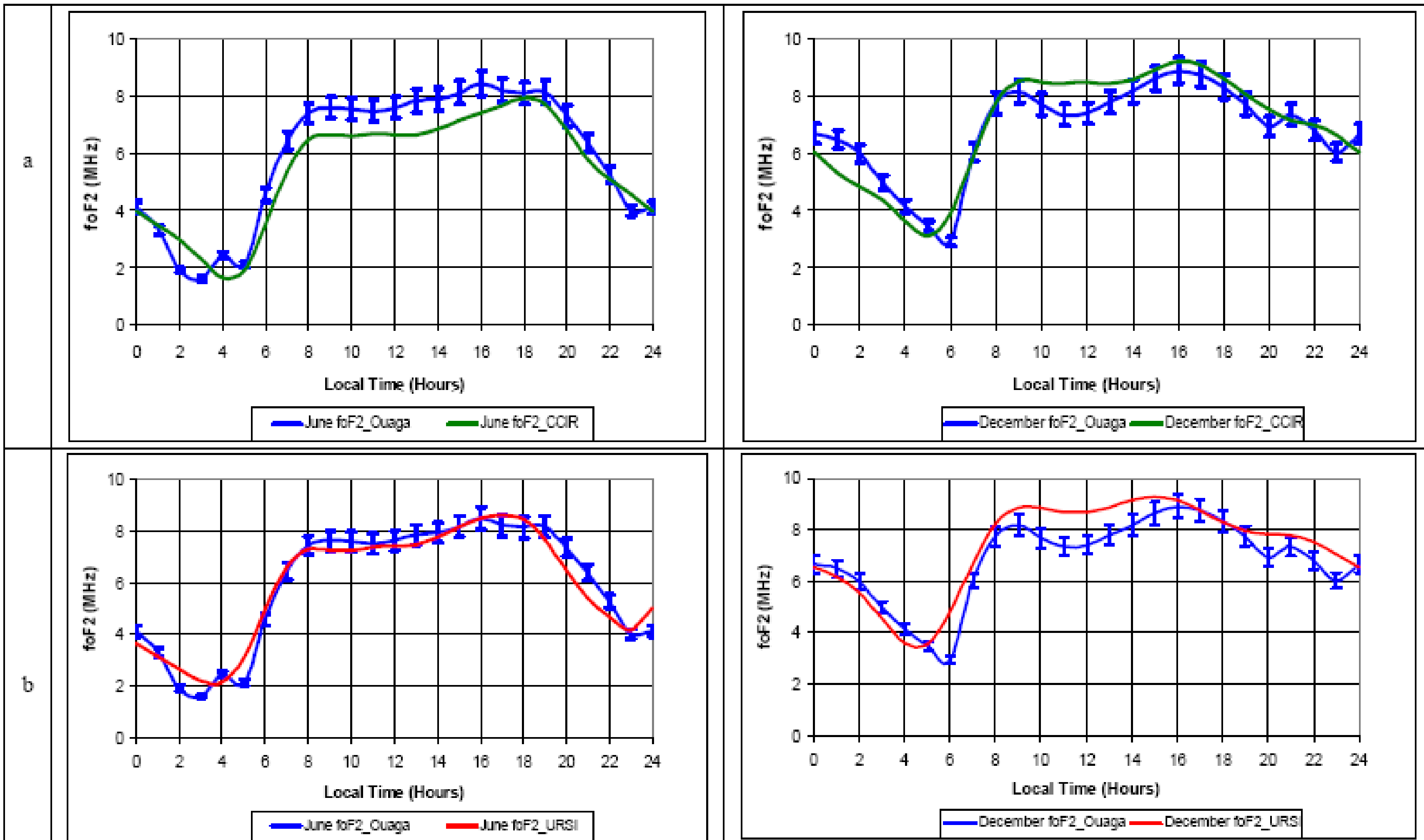
Results-5b: Comparison IRI -2007 and data: Solar increasing phase and Solstice months



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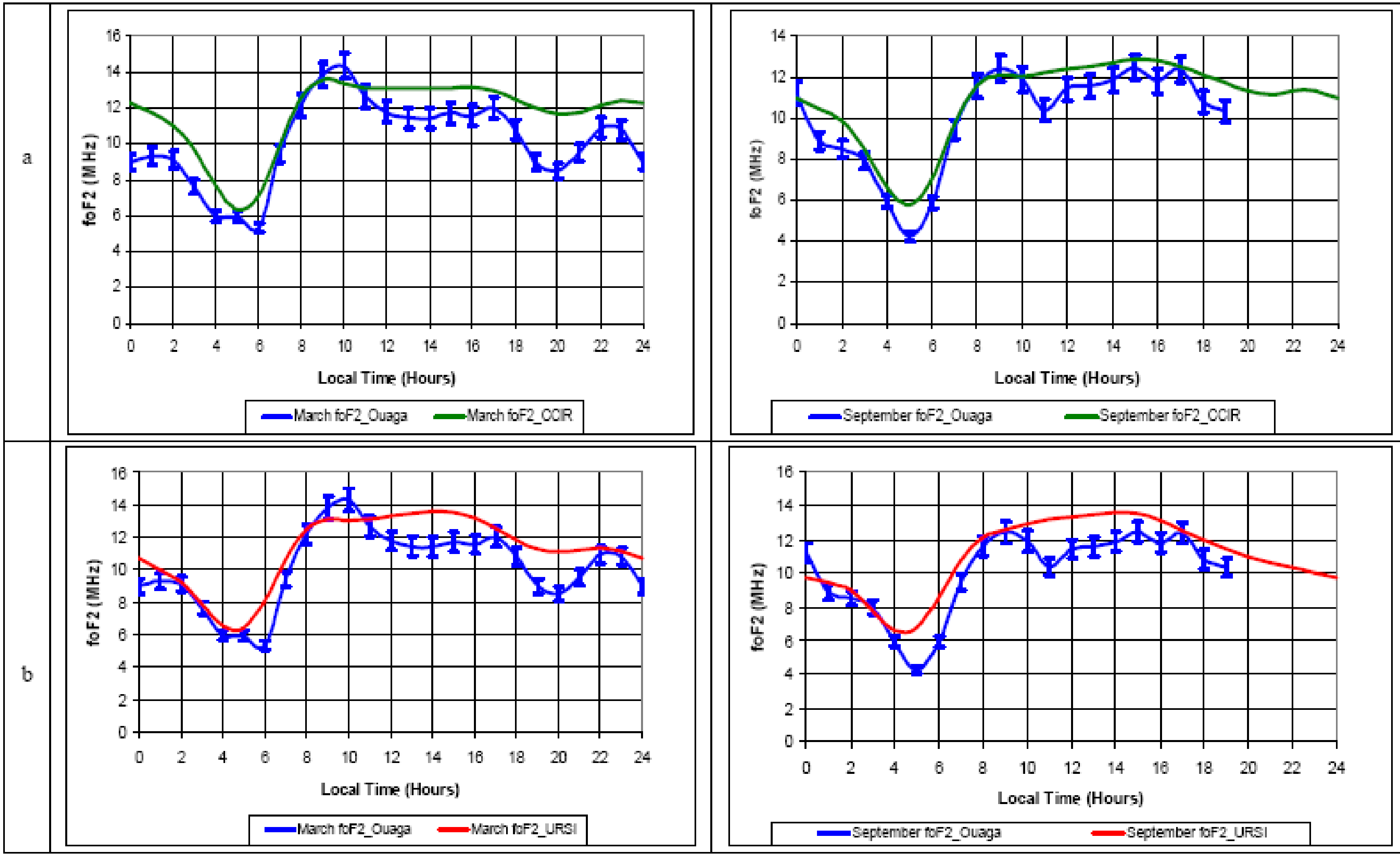
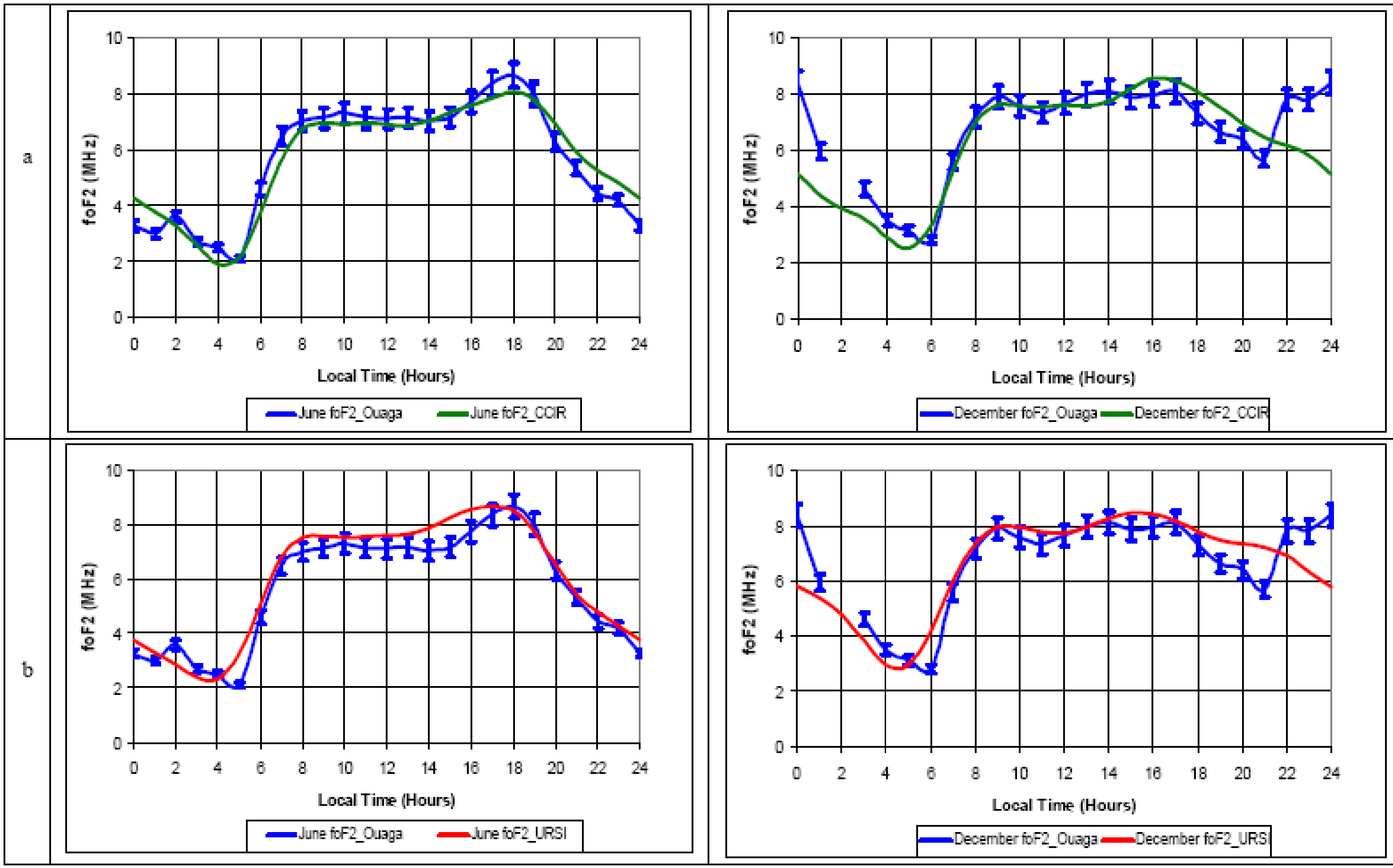
Results-6a: Comparison IRI -2007 and data:

Solar Decreasing phase and Equinox months



Results-6b: Comparison IRI -2007 and data:

Solar Decreasing phase and Solstice months



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Conclusion

The accuracy of the model is the best during solar minimum and the worst during solar maximum

IRI prediction depends on season and solar cycle phase

IRI does not reproduce the curve concavity even though it muches all data curve peaks

IRI predictions are better for CCIR than for URSI

It is necessary to improve the model by integrating data as its imput parameters

and test it for the other solar event periods

Acknowledgement

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Dear participants, thank you for your attention