

CHANGE IN THE SYSTEMS PRESSURE AND THE ATMOSPHERIC CIRCULATION TO 500 HPA ON THE AMAZONIAN BASIN AND THE FLUCTUATIONS OF VOLUME OF THE RIMAC RIVER OF LIMA – PERU IN SUMMER

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I . Introduction

The rain over Rimac river basin of Lima – Peru in summer is related with the distribution of the South Pacific and Atlantic Anticyclons over the Sudamerica continent and the Anticyclonic circulation at 500 hPa over the Amazonian basin.

The Rimac river have a hydrologic regimen seasonal with a high flow in summer and a low or deficiency flow in winter.

The fluctuation temporal of the rain over Rimac river basin is associate with the dynamical of the South Pacific Anticyclon over the west coast of Sudamerica, the dynamical of the South Atlantic Anticyclon over the east coast of Sudamerica and the Anticyclon circulation at 500 hPa over the Amazon basin.

II . The Rimac river

The Rimac river basin is located in Lima – Perú between the latitude of 11°32' S to 12°15' S and between longitude of 076° 08' W to 077° 10' W.

The Rimac river is the source importan of supply of water potable and the generating of electrical energy for the Lima city - Perú.

The flow is origin for the rain over Highland central of the Perú in summer, of the melt of the snow mountain range of Highland central and of the Santa Eulalia and San Mateo rivers.

The hydrologic regimen is characterized of a cycle yearly composite for four hydrologics period:

- a. The period of flood: begining between december to april
- b. The period of flood to dry: begining between april to may
- c. The period dry begining between may to november
- d. The period of dry: to flood: begining between november to december

Flow of the Rimac river (m/sec) computed in Chosica station – Peru of SENAMHI

Juanuary	38.6
February	59.3
March	72.5
April	40.0
May	21.7
June	16.4
July	12.9
August	14.6
September	13.7
October	16.2
November	16.4
December	23.1

III . The Systems Meteorological of interaction over the Rimac river basin

The systems meteorological of interaction over the Rimac river basin are constitute for the systems of pressure and the atmospheric circulation at 500 mb.

a. The pressure atmospferic systems

The pressure systems generating of rain over the Rimac river basin, is constitute for the South Pacific Anticyclon, the South Atlantic Anticyclon and the pressure systems over the Sudamerica continent.

The South Pacific Anticyclon (SPA) is a pressure semi – permanent system located over the South – east Pacific ocean basin. The system register fluctuation spatial and dynamical at scale seasonal and synoptic. The location or the intensify over the west coast of Sudamerica cause the stability atmosphere over the Coast and Highland of the Perú. The weaken or the displacement to west of the system of the west coast of Sudamerica cause the decreasing of the stability atmospheric over

the Coast and Highland of the Perú

The South Atlantic Anticyclon (SAA) is a pressure semi – permanent system located over the South – east Atlantic ocean basin. The system register fluctuation spatial and dynamical at scale seasonal and synoptic. The incursion of the ridge of the Anticyclon over the Amazonian basin cause the advection of the moist air of the Amazonian basin over the Perú and the displacement to east or the location over the east coast of Sudamerica of the Anticyclon cause the decreasing of the intensity of the advection of moist air over the Perú

The pressure systems over continent are generating for the dynamical isolate and couple of the pressure semi – permanent systems over Sudamerica, the warming continent or for the change seasonal (summer, winter)

The continent pressure systems are composite for the Bolivia low, the trough continent at 068° W, the Extratropical low in shape v, the Amazonian basin low and the Argentina continent Anticyclon.

The system of pressure low cause the instability and the Anticyclon provoke the advection of the moist air of the Tropical region or the stability over the Jungle and Highland of the Perú, of accord with the location and the orientation of the ridge of the Anticyclon over the Amazonian basin.

b. The atmospheric circulation at 500 hPa.

The atmospheric circulation at 500 hPa over the Rimac river basin is composite for the Anticyclon circulation of the Amazonian basin, the West circulation and the Anticyclon circulation of the South Pacific ocean

The Anticyclon circulation of the Amazonian basin of accord with the location and the orientation of the ridge over the Amazon basin cause the stability atmospheric or the advection of moist air of the Amazonian basin over the Highland and Jungle of the Perú.

The West circulation (Westerlies) over west coast of Sudamerica cause the advection of air dry or the block of the moist air of the Amazonian basin over the Coast and Highland central of the Peru, of accord with the location and the orientation of the circulation over the west coast of Sudamerica.

The South Pacific ocean Anticyclon circulation over the west coast of Sudamerica cause the stability atmospheric over the Coast and Highland of the Peru.

IV . The rain over the Rimac river basin in summer

The rain over the Rimac river basin is associate with the instability atmospheric over central region of

Sudamerica associate with the advection of the moist air of the Amazonian basin at 500 hPa over Highland and Jungle of the Peru, the advection the moist air of the Amazonian basin over the central Highland of the Peru between the surface and the 500 hPa or the advection the moist air of the Amazonian basin at 500 hPa over Highland and Jungle central of the Peru.

The instability atmospheric is cause for the system pressure over the central zone of Sudamerica (Bolivia low, trough continental at 068° W, Extratropical low in shape v, Amazonian basin low, frontal low) and the advection the moist air is produced for the incursion of the ridge of the South Atlantic Anticyclon over the Amazonian basin, the rigde of the Argentina continent Anticyclon over south zone of Bolivia or for the Anticyclon circulation at 500 hPa of the Amazonian basin.

V . The Fluctuation of the rain over Rimac river basin associate with the systems pressure and the atmospheric circulation to 500 hPa on the Amazonian basin

The fluctuation temporal of the rain over Rimac river basin is relation with the dynamical of the South Pacific Anticyclon over the west coast of Sudamerica continent, the dynamical of the South Atlantic Anticyclon over the east coast of Sudamerica and the location and orientation of the Anticyclon circulation at 500 mb over the Amazonian basin.

a. The sinoptic configuration of the deficiency of the rain over the Rimac river

basin is associate with the following process physic:

1. The stability atmospheric over the west coast of Sudamerica

associate with stability atmospheric at 500 hPa over the Amazonian basin.

case:

a. The South Pacific Anticyclon over the west coast of Sudamerica

continent associate with the Anticyclon circulation at 500 hPa over the western region of the Amazonian basin.

The position of the South Pacific Anticyclon over the west coast of Sudamerica continent and the location of the Anticyclon circulation at 500 hPa over the western zone of the Amazonian basin cause the stability atmospheric over the Coast, Highland and Jungle central of the Peru.

b. The South Pacific Anticyclon over the west coast of Sudamerica

continent associate with the West circulation at 500 hPa over the Amazonian basin.

The position of the South Pacific Anticyclon over the west coast of Sudamerica continent cause the stability atmospheric over the Coast and Highland central of the Peru and the West circulation at 500 hPa over the Amazonian basin cause the block of the circulation of the moist air of the Amazonian basin over the Highland and Jungle central of the Peru.

2. The stability atmospheric over the west coast of Sudamerica

continent associate with the deficiency of the advection of moist air of the Amazonian basin at 500 hPa.

case

a. The South Pacific Anticyclon over the west coast of Sudamerica

continent associate with the Anticyclon circulation at 500 hPa over the east coast of Sudamerica continent.

The position of the South Pacific Anticyclon over the west coast of Sudamerica continent produced the stability atmospheric over the Highland and Jungle central of the Peru and the Anticyclon circulation at 500 hPa over the east coast of Sudamerica continent provoke the decreasing of the advection of moist air of the Amazonian basin over the Highland and Jungle central of the Peru.

3. The instability atmospheric over west coast of Sudamerica associate

with stability atmospheric at 500 hPa over the Amazonian basin.

case:

a. The Depression over central region of Sudamerica associate with

the Anticyclon circulation at 500 hPa over western region of the Amazonian basin

The Depression (Bolivian low, trough continental at 068° W, Extratropical low in shape v, Amazonian basin low, frontal low) over central region of

Sudamerica, provoke instability over the Highland and Jungle of the Peru originating the movement of ascent, however the location of Anticyclon circulation at 500 hPa over western region of the Amazon basin provoke the stability atmospheric.

4. The stability atmospheric over the Amazonian basin at 500 hPa

The Anticyclon circulation at 500 hPa over the western region of Amazonian basin provoke the stability atmospheric over Highland of the Peru.

5. The instability atmospheric over the west coast of Sudamerica

associate with the deficiency of the advection of moist air of the Amazonian basin at 500 hPa over the Highland and Jungle of the Peru.

Case:

a. The South Pacific Anticyclon over the South Pacific ocean associate with the Anticyclon circulation at 500 hPa over the east coastal of Sudamerica.

The displacement to west of the South Pacific Anticyclon of the west coastal of Sudamerica cause the decreasing of the stability atmospheric over the Coast and Highland central of the Peru, however the location of the Anticyclon circulation at 500 hPa over the east coast of Sudamerica cause the decreasing of the advection moist air of Amazonian basin

over Highland and Jungle of the Peru.

b. The South Pacific Anticyclon over the west coast of Sudamerica

associate with the Anticyclon circulation at 500 hPa over the east coast of Sudamerica.

The weaken of the intensity of the South Pacific Anticyclon over the west coast of Sudamerica continent cause the decreasing of the stability atmospheric over the Coast and Highland central of the Peru, however the location of the Anticyclon circulation at 500 hPa over the east coast of Sudamerica cause the decreasing of the advection moist air of Amazonian basin over Highland and Jungle central of the Peru.

c. The Depression over central region of Sudamerica associate with the

Anticyclon circulation at 500 hPa over the east coast of Sudamerica

The Depression (Bolivia low, trough continental at 068° W, Extratropical low in shape v, Amazon basin low, frontal low) over central region of Sudamerica, cause instability over the Highland and Jungle of the Peru originating the movement of ascent, however the location of the Anticyclon circulation at 500 hPa over the western region of the Amazonian basin cause the stability atmospheric.

6. The stability atmospheric over the west coast of Sudamerica.

case:

a. The South Pacific Anticyclon and the Anticyclon circulation at 500 hPa

The position of the South Pacific Anticyclon and the South Pacific ocean Anticyclon circulation at 500 hPa over the west coast of Sudamerica continent cause the stability atmospheric over the Coast and Highland central of the Peru.

b. The South Pacific Anticyclon and the West circulation (Westerlies) at 500 hPa over the west coast of Sudamerica.

The position of the South Pacific Anticyclon over the west coast of Sudamerica continent cause the stability atmospheric over the Coast and Highland central of the Peru and the West circulation at 500 hPa over the west coast of Sudamerica continent cause the advection of air dry over the Coast and Highland central of the Peru.

b. The sinoptic configuration of heavy rain over Rimac river basin is associate

with the following process physic:

1. The advection of moist air of the Amazonian basin

Case

a. The rigde of South Atlantic Anticyclon associate with the Anticyclon

circulation at 500 hPa over the central region of the Amazonian basin.

The incursion of the ridge of the South Atlantic Anticyclon and the Anticyclon circulation at 500 hPa over the central region of the Amazonian basin cause the advection of moist air of the Amazon basin and South Atlantic ocean over the Highland and Jungle central of the Peru.

The coupling of the ridge of the South Atlantic Anticyclon and of the Anticyclon circulation at 500 hPa cause a continue of the advection of moist air of the Amazonian basin and South Atlantic ocean over the Highland and Jungle of the Peru between the layer of the surface and the 500 hPa.

b. The rigde of Argentina continent Anticyclon over the south-west region

of Bolivia associate with the Anticyclon circulation at 500 hPa over the central region of the Amazonian basin.

The incursion of the ridge of the Argentina continent Anticyclon over the south-west region of Bolivia cause the advection of moist air of the Tropical region over the Highland and Jungle central of the Peru and the Anticyclon circulation at 500 hPa over the central region of the Amazonian basin cause the advection of moist air of the Amazon basin and Sotuh

Atlantic ocean over the Highland and Jungle of the Peru.

The cuopling of the ridge of continent Anticyclon with the Anticyclon circulation at 500 hPa cause a continue of the advection of moist air of the Amazonian basin over the Highland and Jungle central of the Peru between the layer of surface and the 500 hPa.

- c. The Anticyclon circulation at 500 hPa over the central region of the Amazonian basin.

The incursion of the ridge of the Anticyclon circulation at 500 hPa over the central region of the Amazonian basin cause the advection of moist air of the Amazon basin and South Atlantic ocean over the Highland and Jungle central of the Peru.

2. The instability atmospheric over the central region of Sudamerica

associate with the advection of moist air of the Amazonian basin at 500 hPa.

case:

- a. The Depression over the central region of Sudamerica associate with

the Anticyclon circulation at 500 hPa over the central region of the Amazonian basin

The Depression (Bolivia low, trough continent at 068° W, Extratropical low in shape v, Amazon basin low, frontal low) over central region of Sudamerica, cause the

instability over the Highland and Jungle of the Peru originating the movement ascent and the Anticyclon circulation at 500 hPa over the central region of the Amazonian basin cause the advection of moist air of the Amazon basin and South Atlantic ocean over the Highland and Jungle central of the Peru.

- b. The South Pacific Anticyclon over the South Pacific ocean associate with

the Anticyclon circulation at 500 hPa over the central region of the Amazonian basin

The displacement to west of the South Pacific Anticyclon of the west coast of Sudamerica cause the decreasing of the stability over the Coast and Highland of the Peru originating the movement of ascent over the Highland central of the Peru and the Anticyclon circulation at 500 hPa over central region of the Amazonian basin cause the advection of moist air of the Amazon basin and of the South Atlantic ocean over the Highland and Jungle central of the Peru.

- c. The South Pacific Anticyclon over of the west coast of Sudamerica

associate with the Anticyclon circulation at 500 hPa over the central region of the Amazonian basin

The weaken of the intensify of the South Pacific Anticyclon over the west

coast of Sudamerica cause the decreasing of the stability atmospheric over the Coast and Highland of the Peru and the Anticyclon circulation at 500 hPa over central region of the Amazonian basin cause the advection of moist air of the Amazon basin and of the South Atlantic ocean over the Highland and Jungle central of the Peru.