General comment:
In this paper, three methods are used to determine the frequency of flows in the flood prone period (i) during six month of a year, (ii) divided into ten day sub-periods, (iii) above a chosen set of thresholds into a reservoir. The three methods consist of: (i) a curve fitting method using the von Mises (circular normal) distribution, (ii) a conventional ranking method and (iii) a more complicated fractal method to find the self-similarity of the three largest floods in each sub-period.

Authors' response:
Thank you for these comments, which represent a good summary of the methodology presented in the paper. However, A POT (Peaks-Over-Threshold sampling) method was used to select samples for the mixed Von Mises distribution method, which achieves the independence of flood sample and makes up for short flood records. Therefore, results based on POT method can reflect the rules of flood occurrence.

General comment:
No time series analysis is performed and there is limited discussion of reservoir levels in conjunction with inflows;

Authors' response:
1) In this paper, we try to find out the pattern or the rule of the flood timing of the research reservoir, so we have recorded the **first three largest daily inflows of each year in the 43-year research period** and thus there are **43 groups of the three largest daily inflows**.
2) Discussion of reservoir levels in conjunction with inflows is presented in section 3.2(Analysis on flood control levels of different sub-seasons for Hongfeng reservoir) and accordingly conducts f**lood regulation calculation** (Table 4) under three different regulation strategies (open-discharge strategy, strategy for operating in 1987 and strategy for check in 1990). Based on the flood regulation calculation in sub-seasons, we obtain the different ranges of flood control level in each sub-season as upper limit, with the fixed flood control level of the original plan as the lower limit. Both upper limit and ower limit are presented **by reservior level**. Actually, flood control function of reservoir is to regulate the process of reservoir outflow, with maximum discharge and highest water level to meet requirements for flood control during a flood flow.

General comment:
In my opinion, this paper is not about hydrology, but mathematicity. However, in mitigation, a re-read of the paper finds on page 10432, lines 22-26, that the methods of flood regulation are limited in China: "Regulation for calculating design flood of water resources and hydropower projects of China requires that flood season separation should consider the design requirements of projects, and have appropriate flood timing according to seasonal varying flood patterns. This means design floods of different sub-seasons should be calculated based on flood characteristics for project design for practical construction and operation."

Authors' response:
1) This paper focus on the most basic hydrology principle analysis----flood regulation although it presents three different resolutions by different methods.
2) In this paper we selected a reservoir in China to do case research, so the latter calculation should be consistent with the specific Chinese regulations about reservoir and hydro-projects. But the methods proposed in this paper can also be applied to reservoirs or projects in other countries considering that most of the world's reservoirs adopt fixed flood control level in flood season and they can also raise it a bit to create more benefits, and when they conduct such calculations, certainly they should follow their own regulations.

General comment:

In my opinion this paper lacks originality, does not address the scheduling problem, is rather parochial in its referencing, is not of sufficient interest nor of high enough standard.

Authors' response:

1)**For Originality**: Reservoirs have a significant role in resolving the tension between the water supply and demand, especially in China where vast water demands have **intensified the problem of water scarcity**. Regulation for **calculating design flood** of water resources and hydropower projects of China **requires that flood season separation** should consider the design requirements of projects, and have appropriate flood timing according to seasonal varying flood patterns.

2) **For the scheduling problem:** Main roles of reservoir are flood control and useful dispatching which are contradictory functions. In China, the flood control level in flood season is fixed and is determined by the historic annual maximum design flood data of reservoir. But it's impossible that the actual floods in the entire flood season every year are of the magnitude of the maximum design flood. As a result, sometimes in the flood season the reservoir is forced to abandon water, which is unreasonable and uneconomic. **Therefore, this paper adopts sub-season design flood instead of** regular annual maximum design flood and it is an important way to improve the efficiency of reservoir operation.

3) **As for references:** Some new references are added.

Authors' changes in manuscript:

Ref. added in the revised version:

1) Pan Liu, Liping Li, Shenglian Guo, Lihua Xiong, Wang Zhang, Jingwen Zhang, Chong-Yu Xu. Optimal design of seasonal flood limited water levels and its application for the Three Gorges Reservoir, Journal of Hydrology, 527 (2015) 1045–1053

2) Yanlai Zhou, Shenglian Guo, Pan Liu, Chongyu Xu. Joint operation and dynamic control of flood limiting water levels for mixed cascade reservoir systems, Journal of Hydrology 519 (2014) 248–257

3) Ruan Yun, Vijay P. Singh. Multiple duration limited water level and dynamic limited water level for flood control with implications on water supply, Journal of Hydrology (2008) 354, 160– 170

4) Xiang Li, Shenglian Guo, Pan Liu, Guiya Chen. Dynamic control of flood limited water level for reservoir operation by considering inflow uncertainty, Journal of Hydrology 391 (2010) 124–132

5) Zhiqiang Jiang, Ping Sun, Changming Ji, Jianzhong Zhou. Credibility theory based dynamic control bound optimization for reservoir flood limited water level, Journal of Hydrology 529 (2015) 928–939

Specific comment:

the reservoir draw-dawn levels are offered in Figure 5, but the way these are obtained is obscure.

Authors' response:

1) Considering that this paper mainly highlights the methods for flood season separation, so there are not so many details in this paper about the determination of the flood control level in each sub-season, and by figure 5 we just want to show that flood control levels can be raised above the original fixed one based on the flood season separation.

2)Based on the flood regulating calculations in sub-seasons, we obtain the ranges of flood control level in each sub-season as upper limt, with the fixed flood control level of the original plan as the lower limit.

3) As you can see in figure 5, there is a raise of the flood control level in each sub-season and with different methods for separation comes different flood regulating calculations and thus flood control level is raised to different extents.

Authors' changes in manuscript:

The following sentences are added to the end of the last paragraph of section 3.2.

"Based on the flood regulating calculations in sub-seasons, we obtain the ranges of flood control level in each sub-season with the fixed flood control level of the original plan as the lower limit. As is seen in figure 5, there is a raise of the flood control level in each sub-season and with different methods for separation comes different flood regulation calculations and thus flood control level is raised to different extents."

Specific comment:

Also, it is not clear, from the time series of the top three highest flows in Figure 2, that ranking has been maintained - in the intervals 6-2 to 6-22 and on 7-12, it appears that the m maximum flow in a 10-day period is lower than the 3rd largest flow, which is nonsense

Authors' response:

1) When using the fractal method, we try to find out the pattern or the rule of the flood timing of the research reservoir, so we have recorded the first three largest daily inflows of each year in the 43-year research period and thus there are 43 groups of the three largest daily inflows. When plotting them on graph, we got three series which you can see in figure 2.
2) Taking the largest series as an example, the horizontal axis does represent date, but points in this series don't come from the same year but from 43 years, so 43 points form a series. Noting that there are some years in which the largest daily inflows are lower than the second largest of latter years, and they occurred on very near dates, so the graph may be confusing by making you think it's unreasonable that some part of the largest series is below the second or third largest series, but the points are actually from different years. In order to find out which period is flood prone and the overall magnitude of floods in different period , we have to plot those three series in the above way.

Author's changes in manuscript:

To make the confounding Fig.2 clear for readers, the following sentences are added to the start of the second paragraph of section 3.1.2:

"The first three largest daily inflow series in a 43-year research period are adopted as research sample and thus 43 points form a series. Note that there are some years in which the largest daily inflows are lower than the second largest of latter years, and they occurred on very near dates in different years, so some parts of the three series are tangled."

Specific comment:

it is worrying that in Figure 4, the 'mixed von Mises' distribution which is a composite of three distributions, misses the observations' frequencies by 10 days [late] for the two highest probabilities of flood prone time intervals, which is not useful.

Authors' response:

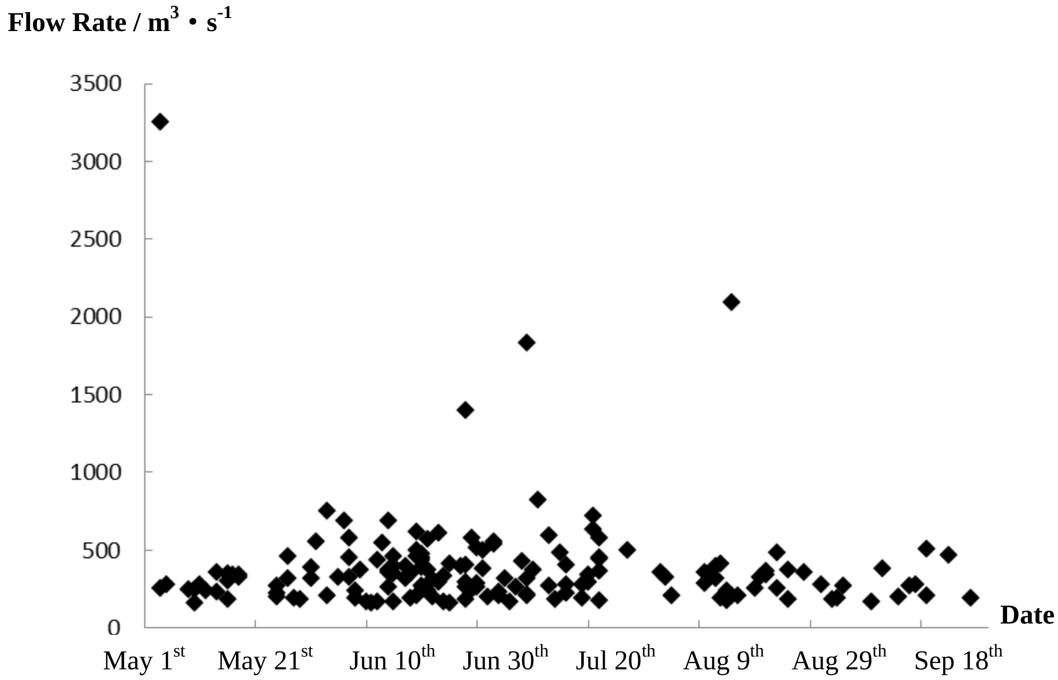
1) In figure 4, the fitting curve is not completely consistent with the actual distribution, but fitting cannot be 100% accurate. What we want to draw from the fitting graph is in which period flood is the most prone to occur and then separate the flood season accordingly, and the lag during June on the graph has little impact on the flood season separation as we combine June and July into one sub-season.

2) The scatter plot used to draw figure 4 is as follow. **We used POT method to take flood samples and plot the following graph, based on which we calculated flood frequency in every 10-day period and then obtained figure 4.**

Author's changes in manuscript:

In order to account for the ten-day lag between the theoretical Von mises curve and the observations' frequencies, the following sentences are added to the end of the last paragraph of section 3.1.3.

"As is seen in Fig.4, there is a roughly ten-day lag between the theoretical Von Mises curve and the observations' frequencies during June, but it has little impact on the flood season separation because what matters most is in which period flood is the most prone to occur, and June and July are combined into one season ."



Specific comment:

The tables are uninformative; for example in Table 1, we have a wording problem. The "Number of times" in a chosen 10-day period should be labelled "Distribution of frequency", "Frequency" should be labelled "Cumulative Frequency (%)"; it is irritating to have to unpack these labels to understand the rather unconventional presentation while reading.

Authors' response:

Agreed

Author's changes in manuscript:

The wording problem of the tables has been modified as follows. The label "number of times" and label "frequency" in table 1 have been relabeled as "Distribution of frequency" and "Cumulative Frequency (%)" respectively. The label "number" in table 2 has been relabeled as "situation". Other changes are also listed as follows.

Please replace table 1 in the manuscript with the following table 1.

Month	Ten-day period	Annual largest peak flow		second largest peak flow		Third largest peak flow	
		Distribution of frequency	Cumulative Frequency (%)	Distribution of frequency	Cumulative Frequency (%)	Distribution of frequency	Cumulative Frequency (%)

April	1^{st}-10^{th}	0		0		0	
	11^{th}-20^{th}	0		1	2.326	0	
	21^{th}-30^{th}	0		0		0	
May	1^{st}-10^{th}	0		3	9.302	1	2.326
	11^{th}-20^{th}	1	2.326	3	16.279	4	11.628
	21^{th}-31^{st}	2	6.978	1	18.605	5	23.256
June	1^{st}-10^{th}	4	16.279	3	25.581	5	34.884
	11^{th}-20^{th}	9	37.216	6	39.535	5	46.512
	21^{th}-30^{th}	10	60.465	6	53.488	6	60.465
July	1^{st}-10^{th}	4	69.767	7	69.767	2	65.116
	11^{th}-20^{th}	3	76.744	3	76.744	5	76.744
	21^{th}-31^{st}	5	88.372	1	79.070	3	83.721
Aug.	1^{st}-10^{th}	1	90.698	2	83.721	1	86.047
	11^{th}-20^{th}	1	93.023	2	88.372	1	88.372
	21^{th}-31^{st}	0		2	93.023	0	
Sep.	1^{st}-10^{th}	0		0		1	90.698
	11^{th}-20^{th}	0		3	100	3	97.674
	21^{th}-31^{st}	1	95.366	0		0	
Oct.	1^{st}-10^{th}	0		0		1	100
	11^{th}-20^{th}	1	97.674	0			
	21^{th}-31^{st}	1	100	0			
total		43	100	43	100	43	100

Please replace table 2 in the manuscript with the following table 2.

Table 2. Box-counting Dimensions of Different Flood Sub-seasons.

sub-seasons	situation	time length *T*	starting date (d/m)	ending date (d/m)	Correlation coefficient *R*	Slope *b*	*Dc*
Pre-rainy season	A	20	1^{st} May	20^{th} May	0.97	0.29	1.71
	B	31	11^{th} May	31^{st} May	0.95	0.30	1.70
	C	42	21th May	1^{st} July	0.93	0.42	1.58
Main flood season	D	40	1^{st} June	20^{th} July	0.92	0.44	1.56
	E	50	1^{st} June	20^{th} July	0.96	0.43	1.57
	F	61	1^{st} June	31^{st} July	0.97	0.40	1.60
	G	71	1^{st} June	10^{th} Aug.	0.97	0.28	1.72
Late flood	H	31	1^{st} Aug.	31^{st} Aug.	0.96	0.46	1.54

season I	I	41	1st Aug.	10th Sept.	0.97	0.38	1.62
	J	51	1st Aug.	20th Sept.	0.97	0.44	1.56
Late flood season II	K	20	1st Sept.	20th Sept.	0.98	0.49	1.51
	L	30	1st Sept.	30th Sept.	0.97	0.39	1.61
	M	40	1st Sept.	10th Oct.	0.97	0.38	1.62

Please replace table 3 in the manuscript with the following table 3.

Table 3. Peak Flows of Design Floods of Different Sub-seasons.

method	Frequency/%	Annual largest flow /$m^3 \cdot s^{-1}$	Pre-rainy season/$m^3 \cdot s^{-1}$	Main flood season /$m^3 \cdot s^{-1}$	Late flood season	
					I	II
frequency method	1	1886.0	534.0	2595.5	771.0	570.17
	0.02	3586.8	663.6	3782.9	1021.4	777.49
Copula function	1	1886.0	1559.7	2089.7	1436.5	1436.5
	0.02	3586.8	3111.3	3641.7	2846.2	2846.2

Please replace table 4 in the manuscript with the following table 4.

Table 4. Results of Flood Regulation with the mixed Von Mises distribution.

Frequency (%)	Sub-seasons	Typical flood	Initial water level /m	Straery 1		Scheme 2		Scheme 3	
				highest water level /m	maximum discharge / $m^3 \cdot s^{-1}$	highest water level /m	maximum discharge / $m^3 \cdot s^{-1}$	highest water level /m	maximum discharge / $m^3 \cdot s^{-1}$
1	1st -31st May	“96.5”	1239.4	1240.0	1396.3	1240.0	1399.6	1240.0	1383.2
	1st June -31st July	“91.7”	1238.3	1240.0	1391.2	1240.0	1391.0	1240.0	1391.0
		“96.7”	1236.8	1240.0	1396.7	1240.0	1432.7	1240.0	1432.7
	1st Aug.- 30th Sept.	“00.8”	1239.9	1240.0	1368.7	1240.0	1370.8	1240.0	1368.5
0.02	1st -31st May	“96.5”	1240.7	1242.5	2390.9	1242.5	2394.0	1242.5	2395.1
	1st June -31st July	“91.7”	1241.1	1242.5	2392.3	1242.5	2410.6	1242.5	2410.6
		“96.7”	1237.8	1242.5	2403.3	1242.5	2406.1	1242.5	2395.4
	1st Aug.- 30th Sept.	“00.8”	1241.5	1242.5	2405.5	1242.5	2407.5	1242.5	2405.4